

SLV-777HF/778HF/788HF

RMT-V231B/V232B

SERVICE MANUAL

US Model
Canadian Model

SLV-777HF/778HF/788HF

PX Model
SLV-777HF

Hi-Fi

VHS



Photo : SLV-788HF

- Refer to the **SERVICE MANUAL** of **VHS MECHANICAL ADJUSTMENT VI** for **MECHANICAL ADJUSTMENTS**.
(9-921-647-11)

S MECHANISM

SPECIFICATIONS

System

Format
VHS NTSC standard

Video recording system
Rotary head helical scanning FM system

Video heads
Double azimuth four heads

Video signal
NTSC color, EIA standards

Tape speed
SP: 33.35 mm/s (1 3/8 inches/s)
EP: 11.11 mm/s (7/16 inches/s)
LP: 16.67 mm/s (11/16 inches/s),
playback only

Maximum recording/playback time
8 hrs. in EP mode (with T-160 tape)

Fast-forward and rewind time
Approx. 3 min. (with T-120 tape)

Tuner section

Channel coverage
VHF 2 to 13
UHF 14 to 69
CATV A-8 to A-1, A to W, W+1 to W+84

Antenna
75-ohm antenna terminal for VHF/UHF

Inputs and outputs

LINE-1 IN and -2 IN
VIDEO IN, phono jack (1 each)
Input signal: 1 Vp-p, 75 ohms, unbalanced,
sync negative
AUDIO IN, phono jack (2 each)
Input level: 327 mVrms
Input impedance: more than 47 kilohms

LINE OUT
VIDEO OUT, phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced,
sync negative
AUDIO OUT, phono jack (2)
Standard output: 327 mVrms
Load impedance: 47 kilohms
Output impedance: less than 10 kilohms

S-LINK (CONTROL S IN) (788HF)
Mini jack (1)

CABLE BOX CONTROL (CONTROL S OUT)
Stereo mini jack (plug in power) (1)

Timer section

Clock
Quartz locked

Timer indication
12-hour cycle

Timer setting
8 programs per month (max.)

Power back-up
Built-in self-charging capacitor
Back-up duration: up to 1 hour at a time

General

Power requirements
120 V AC, 60 Hz (US, Canadian models)
110 V AC to 240 V AC, 50/60 Hz
(PX model)

Power consumption
24 W (Except PX model)
20 W (PX model)

Operating temperature
5 °C to 40 °C (41 °F to 104 °F)

Storage temperature
-20 °C to 60 °C (-4 °F to 140 °F)

Dimensions
Approx. 430 × 107 × 287 mm (w/h/d)
Approx. (17 × 4 1/4 × 11 3/8 inches) including
projecting parts and controls

Mass
Approx. 4.3 kg (7 lb 7 oz)

Supplied accessories

Remote commander (1)
Size AA (R6) batteries (2)
75-ohm coaxial cable with F-type connectors (1)
Audio/video cable (3 phono, 1 mini to 3 phono,
1 mini) (1)
Cable Mouse (cable box controller) (1)
Jack cover (1)
Plug adaptor (1) (PX model only)

Design and specifications are subject to change
without notice.

VIDEO CASSETTE RECORDER





SONY®


DIFFERENT SPECIFICATIONS

SPECIFICATIONS	MODEL		SLV-778HF	SLV-788HF
	US, Canadian	PX		
BODY COLOR	TITAN	BLACK	BLACK	BLACK
REMOTE COMMANDER	RMT-V231B		RMT-V231B	RMT-V232B

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  OR DOTTED LINE WITH MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFÉS PAR UNE MARQUE  SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
6. Check the B+ voltage to see it is at the values specified.
7. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA TW-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate low voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

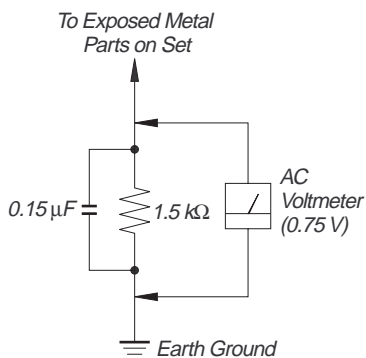


Fig. A. Using an AC voltmeter to check AC leakage.

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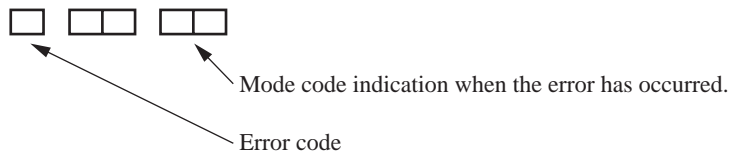
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1. ERROR CODE INDICATION

- Error codes are indicated using the lower 5 digits in the fluorescent display tube.
“At this time, Colon “:” between character is not indicated.”



ERROR CODE

0	No error
1	Cam encoder error Loading direction
2	Cam encoder error Unloading direction
3	T reel error
4	S reel error
5	Capstan error
6	Drum error
7	Error on initializing
8	Cassette loading error
9	Reserve

MODE CODE

0	Power-on eject	10	FWD x1	20	REW play
1	Power-on initial	11	FWD x2	21	Cas. loading
2	Power-off eject	12	CUE	22	Tape loading
3	Power-off stop	13	PB-pause	23	Power-off loading
4	FF	14	RVS-pause	24	Mecha. error (Power on)
5	REW	15	RVS x1	25	Power-on eject initial
6	REC	16	RVS x2	26	Power-off eject initial
7	REC- pause	17	REV	27	APC REC
8	Power-on stop	18	Power-off initial	28	Cas. loading
9	PB	19	Mecha. error (Power off)		(No auto PB check)

2. HOW TO REPLACE A ROTARY UPPER DRUM (777HF, 778HFMODEL)

See below for note.

2-1. HOW TO REMOVE A ROTARY UPPER DRUM

- 1) Remove screw ① (+P3 × 8) and remove the ground shaft assembly ②. (Refer to Fig. 4.)
- 2) Remove soldering which is marked by arrow and remove the rotary upper drum board completely.
- 3) Remove two screws ③ (PSW3 × 8) and remove the rotary upper drum in the direction of ④. (Refer to Fig. 5.)
If removal is difficult, remove it while rotating it slowly.

Note: If removal is difficult, check again if soldering is removed completely.

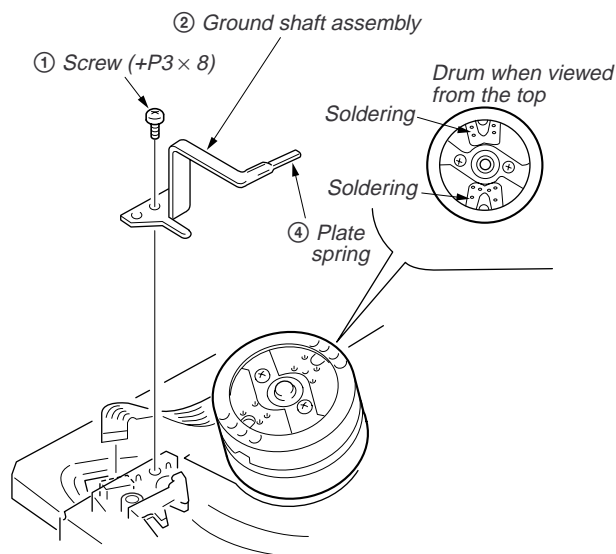


Fig. 4

2-2. HOW TO ATTACH A NEW ROTARY UPPER DRUM

- 1) Pay attention so that finger print or like must not be put when inserting a new upper drum into lower drum.
- 2) Align mark of the rotary upper drum board with the mark of the rotary transformer board so that the screw hole on the upper drum and that on the lower drum are aligned. (Refer to Fig. 5.)
- 3) If attaching is difficult, attach a upper drum while rotating it slowly.

Note: Pay attention not to damage the video heads.
Confirm that the upper drum is inserted completely.

- 4) Tighten the two screws ③ (PSW3 × 8). (Refer to Fig. 5.)
- 5) Fix the earth shaft ② by tightening the screw ① (+P3 × 8) so that protrusion at the tip of the earth shaft contacts the center of the drum shaft.

Note: When attaching the ground shaft assembly ②, never give force to the plate spring ④.

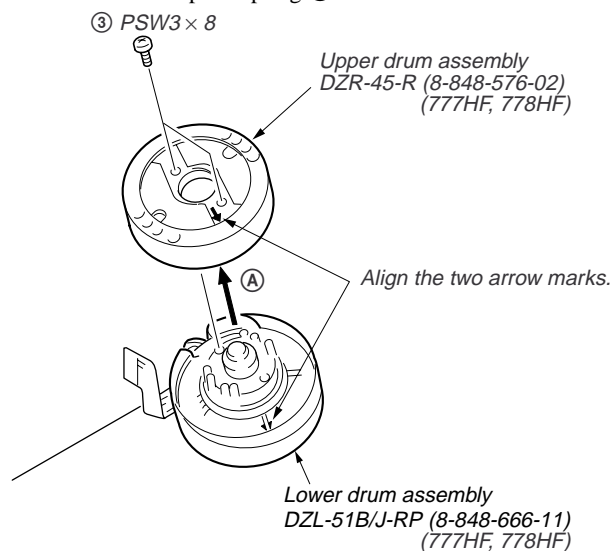


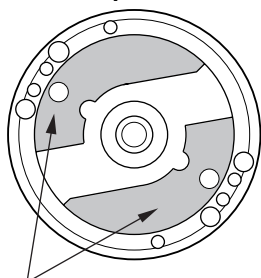
Fig. 5

NOTE : There are two types of drum assembly built in models except SLV-788HF (DZH-94A/Z-RP only).

[Discrimination]

UPPER DRUM ASSEMBLY
DZR-45-R (777HF, 778HF)
(8-848-576-02)

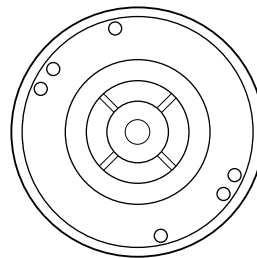
—Top View—



There are two printed circuit boards on the top.

DRUM ASSEMBLY
DZH-94A/Z-RP
(8-839-044-02)

—Top View—



There is no printed circuit board.

Note: It cannot be divided to two parts, the upper and the lower drum assemblies.

Getting Started

Step 1

Unpacking

Check that you have received the following items with the VCR:

- Remote commander
- Cable Mouse (cable box controller)
- Size AA (R6) batteries
- 75-ohm coaxial cable with F-type connectors
- Audio/video cable (3-phono, 1 mini to 3-phono, 1 mini)
- Jack cover

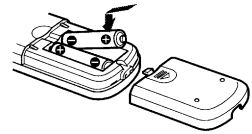
Step 2

Setting up the remote commander

Inserting the batteries

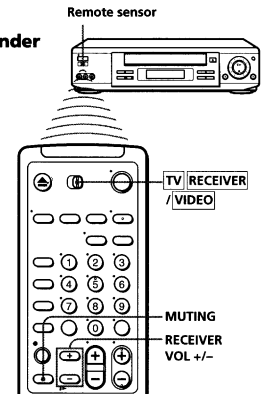
Insert two size AA (R6) batteries by matching the + and - on the batteries to the diagram inside the battery compartment.

Insert the negative (-) end first, then push in and down until the positive (+) end clicks into position.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV or AV receiver. Buttons on the remote commander marked with a dot (•) can be used to operate your Sony TV. The RECEIVER VOL +/- and MUTING buttons can be used to operate your Sony AV receiver.



To operate	Set TV/RECEIVER/VIDEO to
the VCR	VIDEO and point at the remote sensor on the VCR
a Sony TV or AV receiver	TV/RECEIVER and point at the remote sensor on the TV or AV receiver

Notes

- With normal use, the batteries should last about three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.
- Some Sony AV receivers may not be operated with the remote commander.

continued

Step 2: Setting up the remote commander (continued)

Controlling other TVs with the remote commander

The remote commander is preprogrammed to control non-Sony TVs. If your TV is listed in the table below, set the appropriate manufacturer's code number.

- 1 Set **TV/RECEIVER/VIDEO** at the top of the remote commander to **TV/RECEIVER**.
- 2 Hold POWER down, and enter your TV's code number(s) using the number buttons. Then release POWER.

Now you can use the POWER, VOL +/-, CH +/-, and TV/VIDEO buttons to control your TV. You can also use the buttons marked with a dot (•) to control a Sony TV. To control the VCR, reset **TV/RECEIVER/VIDEO** to **VIDEO**.

Code numbers of controllable TVs

If more than one code number is listed, try entering them one at a time until you find the one that works with your TV.

Manufacturer	Code number	Manufacturer	Code number	Manufacturer	Code number
Sony	01	JVC	09	RCA	04,10
Akai	04	KMC	03	Sampo	12
AOC	04	Magnavox	03,08,12	Sanyo	11
Centurion	12	Marantz	04,13	Scott	12
Coronado	03	MGA/Mitsubishi	04,12,13,17	Sears	07,10,11
Curis-Mathes	12	NEC	04,12	Sharp	03,05,18
Daytron	12	Panasonic	06,19	Sylvania	08,12
Emerson	03,04,14	Philco	03,04	Teknika	03,08,14
Fisher	11	Philips	08	Toshiba	07
General Electric	06,10	Pioneer	16	Wards	03,04,12
Gold Star	03,04,17	Portland	03	Yorx	12
Hitachi	02,03	Quasar	06,18	Zenith	15
J.C.Penny	04,12	Radio Shack	05,14		

Notes

- If the TV uses a different remote control system from the one programmed to work with the VCR, you cannot control your TV with the remote commander.
- If you enter a new code number, the code number previously entered will be erased.
- When you replace the batteries of the remote commander, the code number automatically resets to 01 (Sony). Reset the appropriate code number.

Step 3

Hookups

Selecting the best hookup option

There are many ways in which your VCR can be hooked up. To hook up your VCR so that it works best for you, first scan through the table below. Then use the accompanying diagrams and procedures on the following pages to set up your VCR.

If you have	Use	Refer to
TV that has audio/video inputs	Audio/video (A/V) hookup , then follow one of the hookups below.	Pages 8 and 9
Cable box that is compatible with the VCR's cable box control feature	Hookup 1	Pages 10 to 12
No cable box or incompatible cable box with only a few scrambled channels	Hookup 2	Pages 13 to 15
Antenna only, no cable TV	Hookup 3	Pages 16 to 18
Incompatible cable box with many scrambled channels	Hookup 4	Pages 19 to 21
DSS* receiver	Hookup 5	Pages 22 to 24
Incompatible cable box with only a few scrambled channels, using an A/B switch	Hookup 6	Pages 25 to 29

After you've completed the connections, follow the instructions for setup. During setup, if you need more details on the procedure described, page numbers are provided where you can find complete, step-by-step instructions.

After you've completed the setup, you're ready to use your VCR. Procedures differ depending on the hookup you used. For an overview, refer to "Quick reference to using the VCR" on the back cover.

Before you get started

- Turn off the power to all equipment.
- Do not connect the AC power cords until all of the connections are completed.
- Be sure you make connections firmly. Loose connections may cause picture distortion.
- If your TV doesn't match any of the examples provided, see your nearest Sony dealer or qualified technician.

* DSS* is a registered trademark of DIRECTV, Inc., a unit of Hughes Electronics Corporation.

Step 3: Hookups (continued)

Audio/video (A/V) hookup

Pages 8 and 9

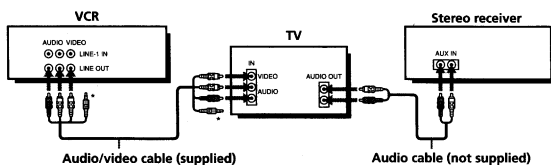
If your TV has audio/video (A/V) input jacks, you will get a better picture and sound if you hook up your VCR using these connections. In addition, for a true "home theater" experience, you should connect the audio outputs of your VCR or TV to your stereo system. If your TV doesn't have A/V inputs, see the following pages for antenna or cable hookups.

If your TV has the S-Link™ (A/V bus control) function, hook up your VCR using the connection shown on page 9. Your TV will automatically switch to the A/V inputs for your VCR when you play back or operate menu on the VCR.

If you're not planning to use your VCR to record programs, you're finished setting up the VCR after you've made the connections shown on pages 8 and 9. If you want to record off-air or off your cable TV system, complete these connections first, and then go to the following pages for antenna or cable hookups.

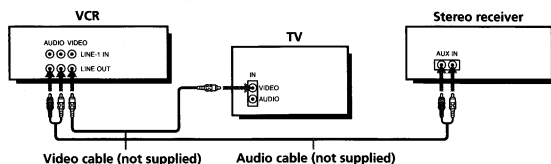
* S-Link™ is a trademark of Sony Corporation.

A Use this hookup if your TV has stereo jacks

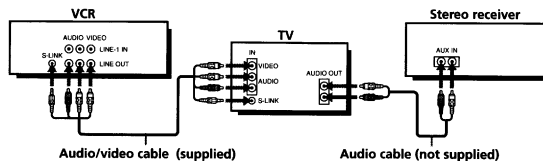


* Do not connect the miniplugs for this hookup.

B Use this hookup if your TV doesn't have stereo jacks



C Use this hookup if your TV has the S-Link™ function



Note

- To play a tape in stereo, you must use the A/V connection.

Caution

Connections between the VCR's VHF/UHF connector and the antenna terminals of the TV receiver should be made only as shown in the following instructions. Failure to do so may result in operation that violates the regulations of the Federal Communications Commission regarding the use and operation of RF devices. Never connect the output of the VCR to an antenna or make simultaneous (parallel) antenna and VCR connections at the antenna terminals of your receiver.

Note to CATV system installer (in USA)

This reminder is provided to call the CATV system installer's attention to Article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

Getting Started

continued

Step 3: Hookups (continued)

Hookup 1

Pages 10 to 12

Using cable box control

Recommended use

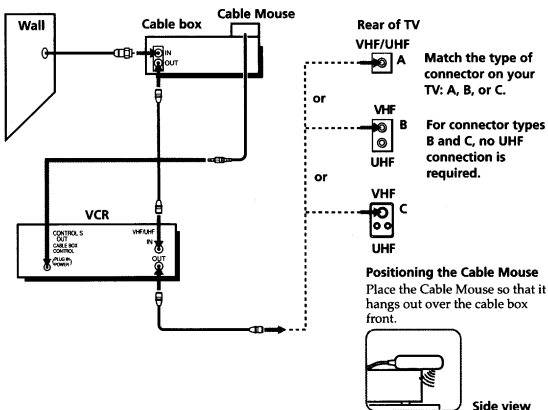
You should use this hookup if you have a cable box, especially if your cable system scrambles all or most channels. This hookup allows the VCR's cable box control feature to control the channel on the cable box, simplifying the recording process. A list of compatible cable boxes is on page 39.

What you can do with this hookup

- Record any channel using the VCR's cable box control feature to select channels on the cable box

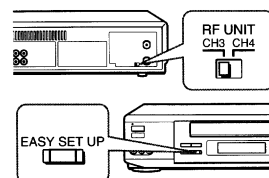
What you can't do

- Record with the cable box turned off
- Record one channel while watching another channel

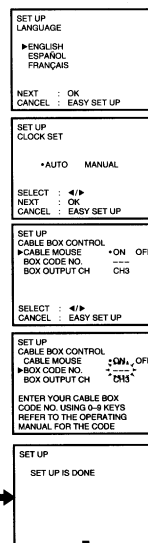


Hookup 1: VCR setup

- Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 76. If you made A/V connections (from page 8), you can skip this step.



- Turn on your cable box.
- Press EASY SET UP on the VCR.
 - The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the joystick (OK). For details, see page 30.
 - The CLOCK SET menu appears. Select AUTO and press the joystick (OK). For details, see page 31.
 - The CABLE BOX CONTROL menu appears. Select ON. For details, see page 38.
 - Enter your cable box code number and push the joystick to ↓. For details, see page 39.
 - Select your cable box output channel and press the joystick (OK).



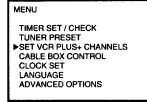
Normal display continued

Getting Started

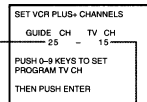
Hookup 1: VCR Plus+ channel setup

- Find the VCR Plus+ Channel Listing in your program guide. For details, see page 47.
- If the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows. For details, see page 48.

- Press MENU and select SET VCR PLUS+ CHANNELS.



- Enter the program guide channel, then the channel you use on your TV.



- Press the joystick (OK).

Program guide channel
Your actual TV channel

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 36.

Note

- To use the automatic clock setting feature, leave the cable box on.

No cable box, or incompatible cable box with only a few scrambled channels

Recommended use

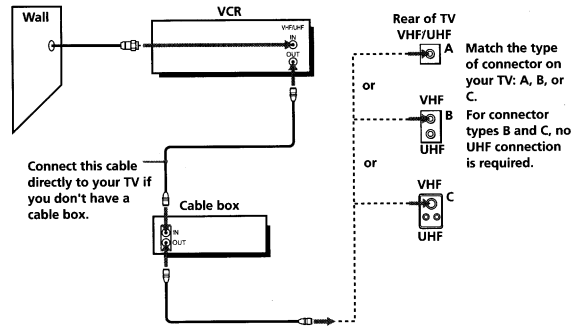
Use this hookup if you do not have a cable box. Also use this hookup if your cable company cannot supply a cable box that is compatible with the VCR's cable box control feature, and your cable system scrambles only a few channels.

What you can do with this hookup

- Record any unscrambled channel by selecting the channel on the VCR

What you can't do

- Record scrambled channels that require a cable box



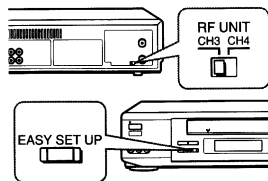
continued

Step 3: Hookups (continued)

Hookup 2: VCR setup

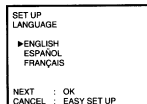
- Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 76.

If you made A/V connections (from page 8), you can skip this step.

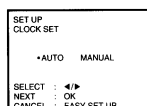


- Press EASY SET UP on the VCR.

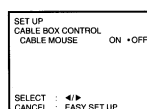
- The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the joystick (OK). For details, see page 30.



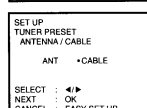
- The CLOCK SET menu appears. Select AUTO and press the joystick (OK). For details, see page 31.



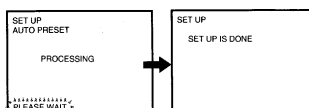
- The CABLE BOX CONTROL menu appears. Select OFF and press the joystick (OK).



- The TUNER PRESET menu appears. Set ANTENNA/CABLE to CABLE and press the joystick (OK). For details, see page 43.



- The AUTO PRESET starts.

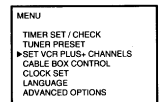


Normal display

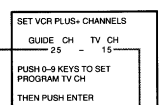
Hookup 2: VCR Plus+ channel setup

- Find the VCR Plus+ Channel Listing in your program guide. For details, see page 47.
- If the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows. For details, see page 48.

- Press MENU and select SET VCR PLUS+ CHANNELS.



- Enter the program guide channel, then the channel you use on your TV.



- Press the joystick (OK).

Program guide channel
Your actual TV channel

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 36.

continued

Hookup 3

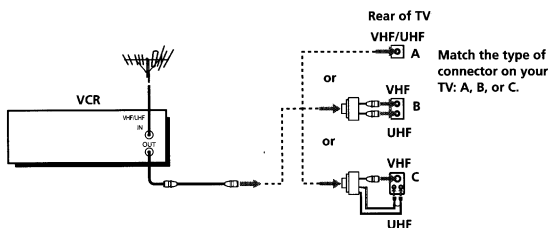
Pages 16 to 18

Antenna hookup

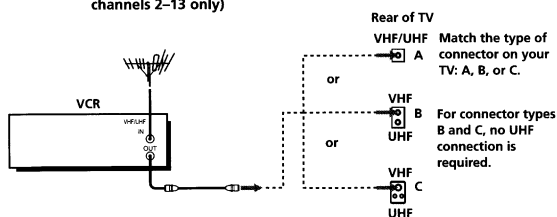
Make the following connections if you're using an antenna (if you don't have cable TV).

A Use this hookup if you're using:

- VHF/UHF antenna (you get channels 2-13 and channels 14 and higher)
- UHF-only antenna (you get channels 14 and higher)
- Separate VHF and UHF antennas



B Use this hookup if you're using a VHF-only antenna (you get channels 2-13 only)

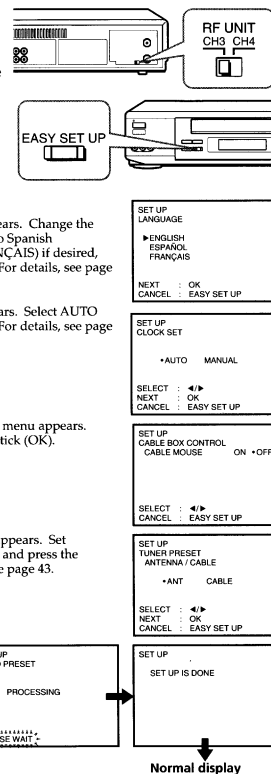


If you cannot connect your antenna cable to the VCR directly

If your antenna cable is a flat cable (300-ohm twin lead cable), attach an external antenna connector (not supplied) so that you can connect the cable to the VHF/UHF IN connector. If you have separate cables for VHF and UHF antennas, you should use a U/V band mixer (not supplied). For details, see page 77.

Hookup 3: VCR setup

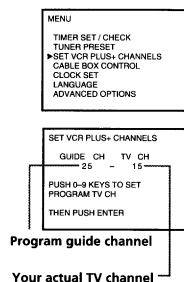
- Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 76. If you made A/V connections (from page 8), you can skip this step.
- Press EASY SET UP on the VCR.
 - The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the joystick (OK). For details, see page 30.
 - The CLOCK SET menu appears. Select AUTO and press the joystick (OK). For details, see page 31.
 - The CABLE BOX CONTROL menu appears. Select OFF and press the joystick (OK).
 - The TUNER/PRESET menu appears. Set ANTENNA/CABLE to ANT and press the joystick (OK). For details, see page 43.
 - The AUTO PRESET starts.



continued

Hookup 3: VCR Plus+ channel setup

- Find the VCR Plus+ Channel Listing in your program guide. For details, see page 47.
- If the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows. For details, see page 48.
 - Press MENU and select SET VCR PLUS+ CHANNELS.
 - Enter the program guide channel, then the channel you use on your TV.
 - Press the joystick (OK).



Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 36.

Hookup 4

Pages 19 to 21

Incompatible cable box with many scrambled channels

Recommended use

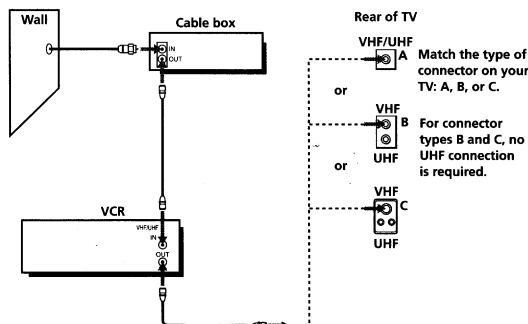
Use this hookup if your cable company cannot supply a cable box that is compatible with the VCR's cable box control feature, and your cable system scrambles all or most channels.

What you can do with this hookup

- Record any channel by selecting the channel on the cable box

What you can't do

- Record with the cable box turned off
- Record one channel while watching another channel
- Select channels directly on the VCR

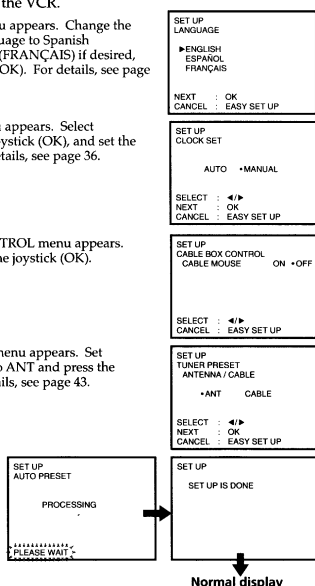
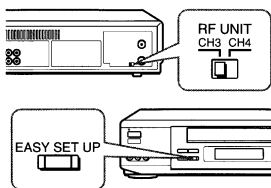


continued

Step 3: Hookups (continued)

Hookup 4: VCR setup

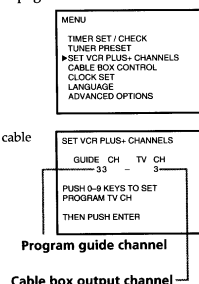
- Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.
For details, see page 76. If you made A/V connections (from page 8), you can skip this step.
- Turn on your cable box.
- Press EASY SET UP on the VCR.
 - The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the joystick (OK). For details, see page 30.
 - The CLOCK SET menu appears. Select MANUAL, press the joystick (OK), and set the clock manually. For details, see page 36.
 - The CABLE BOX CONTROL menu appears. Select OFF and press the joystick (OK).
 - The TUNER PRESET menu appears. Set ANTENNA/CABLE to ANT and press the joystick (OK). For details, see page 43.
 - The AUTO PRESET starts.



Normal display

Hookup 4: VCR Plus+ channel setup

- Find the VCR Plus+ Channel Listing in your program guide. For details, see page 47.
- Enter all the channels you want to record and the cable box output channel (usually 2, 3, or 4). For details, see page 48.
 - Press MENU and select SET VCR PLUS+ CHANNELS.
 - Enter the program guide channel, then the cable box output channel.
 - Press the joystick (OK).



Automatic clock setting

To use the Auto Clock Set feature with this hookup, you need to manually select a channel that carries a time signal:

- Tune the cable box to a channel that carries a time signal.
- Select AUTO in the CLOCK SET menu to turn on the Auto Clock Set feature.
- Turn off the VCR. It automatically sets the clock and adjusts for Daylight Saving Time by picking up the time signal.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 36.

Note

- To use the automatic clock setting feature, leave the cable box on.

continued

Step 3: Hookups (continued)

Hookup 5

Pages 22 to 24

DSS (Digital Satellite System) receiver

Recommended use

Use this hookup if you have a DSS receiver. It allows the VCR's cable box control feature to control the channel on the DSS receiver, simplifying the recording process. A list of compatible DSS receivers is on page 40.

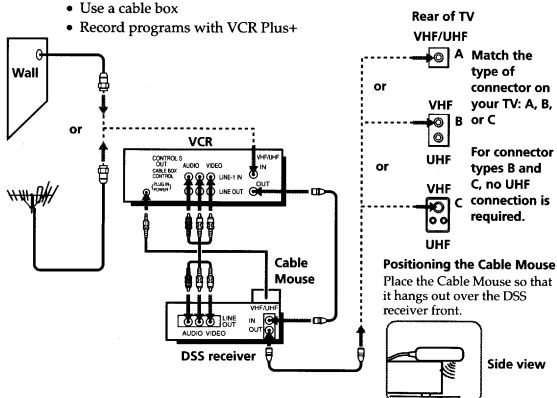
DSS (Digital Satellite System) is a satellite broadcast that provides superior digital-quality video and crisp digital-quality audio. A variety of program packages are available through your program providers. It also has program guides that are sorted by program categories.

What you can do with this hookup

- Record any channels using the VCR's cable box control feature to select channels on the DSS receiver.

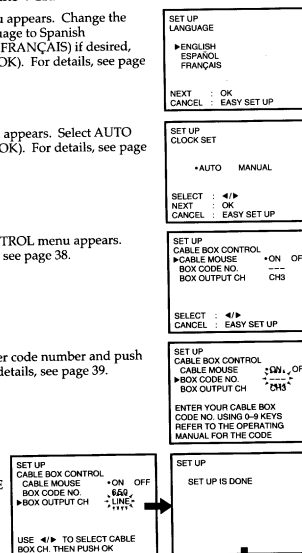
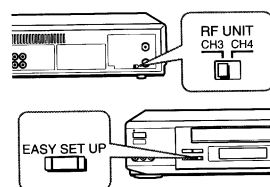
What you can't do

- Record with the DSS receiver turned off
- Record any channels from cable or an antenna (To record channels from cable or an antenna, turn off the cable box control feature.)
- Use a cable box
- Record programs with VCR Plus+



Hookup 5: VCR setup

- Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.
For details, see page 76. If you made A/V connections (from page 8), you can skip this step.
- Turn on your DSS receiver.
- Press EASY SET UP on the VCR.
 - The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the joystick (OK). For details, see page 30.
 - The CLOCK SET menu appears. Select AUTO and press the joystick (OK). For details, see page 31.
 - The CABLE BOX CONTROL menu appears. Select ON. For details, see page 38.
 - Enter your DSS receiver code number and push the joystick to . For details, see page 39.
 - Set your DSS receiver output channel (BOX OUTPUT CH) to LINE and press the joystick (OK).



Normal display

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 36.

Note

- To successfully record a program from the DSS receiver, proceed as follows:
 - Leave the DSS receiver on all the time.
 - Turn off the display (menu screen, channel number, etc.) of the DSS receiver.
 - To record or receive locked channels, unlock the channel before the VCR starts recording.
 - To set pay-per-view programs in the timer setting, order the pay-per-view program before the VCR starts recording.
 - Some programs are copy protected. You cannot record these programs.

Hookup 6

Pages 25 to 29

Incompatible cable box with only a few scrambled channels, using an A/B switch**Recommended use**

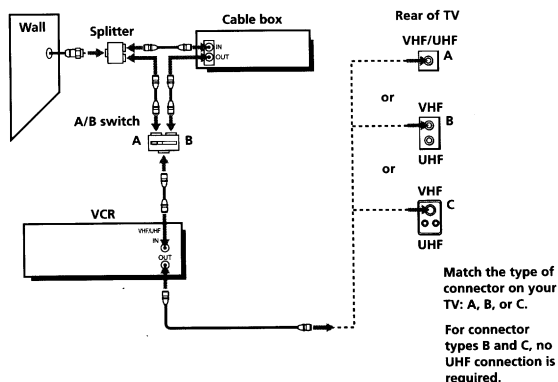
By using an A/B switch (not supplied), this hookup allows you to record both scrambled and unscrambled channels conveniently.

What you can do with this hookup

- Record any unscrambled channel by selecting the channel directly on the VCR (the A/B switch is set to A)
- Record any scrambled channel by selecting the channel on the cable box (the A/B switch is set to B)

What you can't do

- Record one scrambled channel while watching another channel (the A/B switch is set to B)



continued

Step 3: Hookups (continued)**Hookup 6: VCR setup**

- Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.

For details, see page 76. If you made A/V connections (from page 8), you can skip this step.

- Set the A/B switch to "A."

- Press EASY SET UP on the VCR.

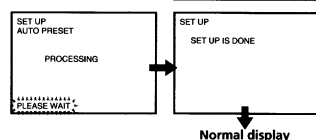
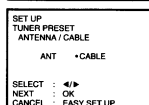
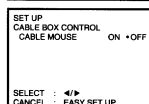
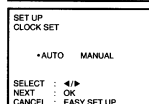
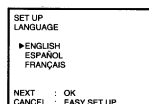
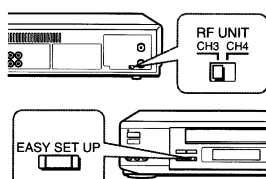
- The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the joystick (OK). For details, see page 30.

- The CLOCK SET menu appears. Select AUTO and press the joystick (OK). For details, see page 31.

- The CABLE BOX CONTROL menu appears. Select OFF and press the joystick (OK).

- The TUNER PRESET menu appears. Set ANTENNA / CABLE to CABLE and press the joystick (OK). For details, see page 43.

- The AUTO PRESET starts.



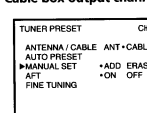
Normal display

- Preset the cable box output channel (usually 2, 3 or 4). For details, see page 45.

- Press MENU and select TUNER PRESET.

- Enter the cable box output channel.

- Set MANUAL SET to ADD and press the joystick (OK).

Cable box output channel

continued

Step 3: Hookups (continued)

Hookup 6: VCR Plus+ channel setup

- Find the VCR Plus+ Channel Listing in your program guide. For details, see page 47.
 - For unscrambled channels, if the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows. For details, see page 48.
 - Press MENU and select SET VCR PLUS+ CHANNELS.
 - Enter the program guide channel, then the channel you use on your TV.
 - Press the joystick (OK).
- Program guide channel**
- Your actual TV channel**
- For scrambled channels, enter all the scrambled channels you want to record and the cable box output channel (usually 2, 3, or 4). For details, see page 48.
 - Press MENU and select SET VCR PLUS+ CHANNELS.
 - Enter the program guide channel, then the cable box output channel.
 - Press the joystick (OK).
- Program guide channel**
- Cable box output channel**

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

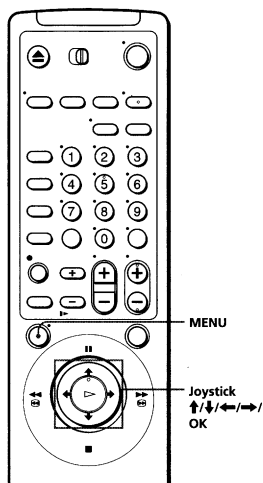
If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 36.

Note

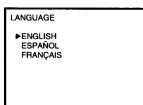
- To use the automatic clock setting feature, set the A/B switch to A.

Selecting a language

You can change the on-screen display language.



- Press MENU, then push the joystick to to move the cursor (P) to LANGUAGE and press the joystick (OK).
- When using the EASY SET UP procedure, skip this step.



- Push the joystick to to select ENGLISH, ESPAÑOL, or FRANÇAIS, then press the joystick (OK).



Setting the clock

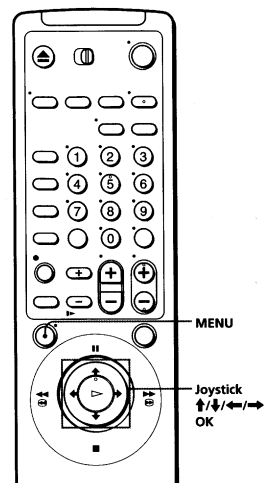
Using the Auto Clock Set feature

Some TV and cable channels transmit time signals with their broadcasts. Your VCR can pick up this time signal to automatically set the clock.

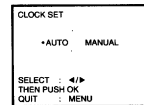
The Auto Clock Set feature works only if a channel in your area is broadcasting a time signal. If broadcasters in your area are not yet sending time signals, set the time manually (page 36).

Before you start...

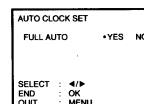
- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VIDEO to display the VIDEO indicator in the VCR's display window.
- Press INPUT SELECT so that a channel number appears in the VCR's display window.



- Press MENU, then push the joystick to to move the cursor (P) to CLOCK SET and press the joystick (OK).




- Push the joystick to to select AUTO, then press the joystick (OK).



continued

Setting the clock (continued)

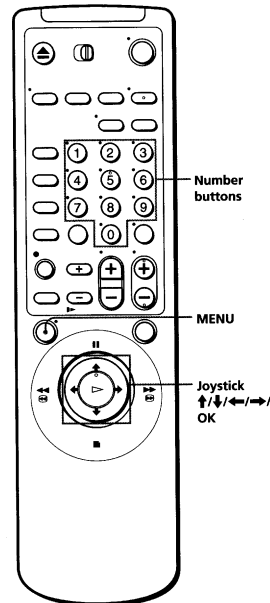
- 3**  Push the joystick to \leftarrow/\rightarrow to select YES, then press the joystick (OK).

- 4** To activate the Auto Clock Set function, turn off the VCR.
The VCR automatically sets the clock by searching for a channel that carries a time signal and sets your time zone and Daylight Saving Time (if applicable).
If your clock is set to the wrong time zone or Daylight Saving Time, you can adjust these settings without turning off the Auto Clock Set feature (page 33).

Notes

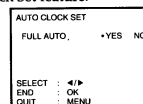
- The clock cannot be set automatically if you don't receive a channel that carries a time signal in your area. If so, set the clock manually.
- If there are only a few channels in your area that carry time signals, setting the clock automatically may take up to about 30 minutes. If nothing happens even after you wait about 30 minutes, set the clock manually.
- If you use Hookup 1, make sure you leave the cable box on.

If the clock is not activated




Getting Started

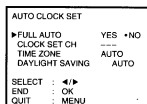
- 1** Follow steps 1 and 2 in "Using the Auto Clock Set feature."
The AUTO CLOCK SET menu is displayed.




continued

Setting the clock (continued)

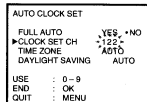
- 2**  Push the joystick to \leftarrow/\rightarrow to select NO for FULL AUTO.



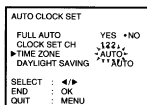
- 3**  Push the joystick to \uparrow/\downarrow to move the cursor (▶) to the item you want to set, then push the joystick to \leftarrow/\rightarrow to make the setting.



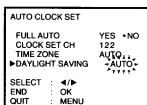
- For CLOCK SET CH**
Leave the setting to "—" to have the VCR automatically search for a channel that carries a time signal.
Press the number buttons to select a channel that carries a time signal. Use this option if you know of a channel that carries a time signal. Most PBS member stations broadcast a time signal. For the fastest response, select your local PBS station.




- For TIME ZONE**
Select the time zone of your area, or select AUTO to have the VCR automatically set your time zone. The options are: AUTO → ATLANTIC → EASTERN → CENTRAL → MOUNTAIN → PACIFIC → ALASKA → HAWAII → AUTO



- For DAYLIGHT SAVING**
Select ON or OFF (standard time), or AUTO to have the VCR automatically set the daylight saving time.



- 4**  Press the joystick (OK).

- 5** To activate the Auto Clock Set function, turn off the VCR.

Note

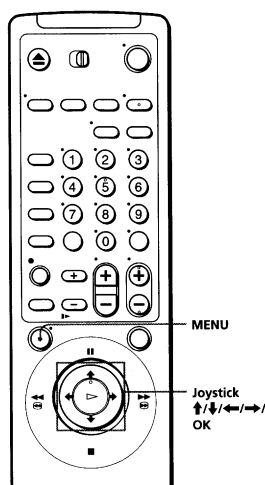
- If you use both the cable box control feature and the Auto Clock Set feature, the VCR automatically changes channels on the cable box until a channel that carries a time signal is found, whenever you turn off the VCR.
If you want to stop the search, change the channel on the cable box with the channel buttons either on the VCR or on the remote commander.

Getting Started

continued

Setting the clock (continued)

Using Manual clock set



- 1** Press MENU, then push the joystick to to move the cursor (▶) to CLOCK SET and press the joystick (OK).

When using the EASY SET UP procedure, skip this step.
- 2** Push the joystick to to select MANUAL and press the joystick (OK).

- 3** Push the joystick to to set the month.
- 4** Push the joystick to to flash the day and push the joystick to to set the day.

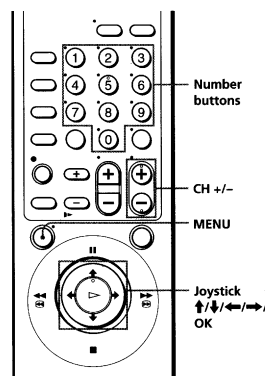
The day of the week is set automatically.
- 5** Set the year, hour and minutes in the same way as the day.
- 6** Press the joystick (OK) to start the clock.

Setting up cable box control

(Skip this section if you are using Hookup 2, 3, 4, or 6.)

Your VCR includes a cable box control feature that allows the VCR to control most brands of cable boxes/DSS receivers via the Cable Mouse. With cable box control, the VCR controls channels on the cable box/DSS receiver for timer recording. You can also use the VCR's remote commander to change channels on the cable box/DSS receiver whenever the cable box/DSS receiver is turned on even if the VCR is turned off. To use cable box control, you need to connect the Cable Mouse (pages 10 and 22) and set the code number and output channel.

This VCR is programmed with codes necessary to control channel selection on most brands of cable boxes at the time this VCR was manufactured. It is possible that new cable boxes may be introduced that cannot be controlled with this VCR's Cable Mouse. If you have a cable box that is incompatible with this VCR, contact your cable operator — they may be able to provide you with a compatible cable box.



- 1** Press MENU, then push the joystick to to move the cursor (▶) to CABLE BOX CONTROL and press the joystick (OK).

When using the EASY SET UP procedure, skip this step.
- 2** Push the joystick to to select ON, then push the joystick to .

"—" flashes in the BOX CODE NO. row.

If a code number has already been entered, push the joystick to to select BOX CODE NO.

- 3** Press the number buttons to enter the cable box/DSS receiver code number, then push the joystick to .

Find your cable box/DSS receiver code number from the chart below.
- 4** If you want to control a cable box, push the joystick to to select the output channel for the cable box, then press the joystick (OK).

If you want to control a DSS receiver, select LINE, then press the joystick (OK).

Cable box and DSS receiver brand and the corresponding code numbers

If more than one code number is listed, try entering them one by one, until you come to the correct code for your equipment.

Cable box brand	Code numbers
ABC	018, 022, 024, 028, 217
Antronix	218
Archer	033, 050, 164, 218, 808
BBT	278
Cable Star	067
Cabletenna	033
Cable time	172, 388, 459
Century	164
Citizen	164, 326, 327
Clyde Cablevision	097
Colour Voice	036, 042
Comband	243, 244
Comtronics	051, 071
Decsat	434
Diamond	046
Eagle Comtronics	051

Cable box brand	Code numbers
Eastern	013, 285
Electricord	089
Electus	055
Focus	411
Garrard	164
GC Electronics	027, 067, 341
GE	243, 244
GEC	097
Gemini	026, 068, 081
General Instrument	022, 287, 487
Hamlin	020, 031, 045, 270, 284
Hitachi	022
Jasco	164, 326
Jerrold	014, 022, 025, 026, 035, 037, 058, 109, 287, 487
Linsay	451

Setting up cable box control (continued)

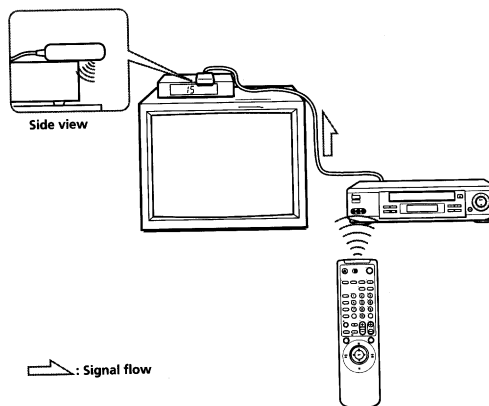
Cable box brand	Code numbers
Macom	044
Magnavox	038, 043, 080
Memorex	011
Movie Time	089, 167, 214
Northcoast	325
Novaplex	629
NSC	074, 081, 167, 214
Oak	018, 030, 259
Panasonic	032, 118
Paragon	011
Philips	036, 038, 039, 040, 041, 042, 071, 301
Pioneer	034, 155, 271, 544, 695
Popular Mechanics	411
Pulsar	011
Radio shack	808
RCA	032
Realistic	218
Recoton	411
Regal	031, 270, 284, 290
Regency	013
Rembrandt	081
Samsung	051, 155
Scientific Atlanta	017, 019, 028, 288
Seam	521
Sharp	324
Signal	051
Signature	022
SL Marx	051
Spectravision	069
Sprucer	032, 318
Standard Components	107, 166
Starcom	014, 026, 058, 109
Stargate	026, 051

Cable box brand	Code numbers
STS	167
Sylvania	012
T-Cable Teletext	116
Tandy	269
Tatung	108
Teknica	157
TeleCaption	232
Teleservice	292
Texscan	012, 107
TFC	321
Timeless	429
Tocom	023, 024
Toshiba	011
Tudi	297
TV86	074
TV COM	018, 030, 259
Uniden	236
Unika	033, 164, 218
United Artists	018
United Cable	014
Universal	033, 050, 067, 088, 089, 164, 202, 218, 333
Videoway	261
Vidtech	255
Viewstar	038, 071, 074, 122, 222, 269, 300
Zenith	011, 065, 536
Zentek	411
Wave Master	576

DSS receiver brand	Code numbers
RCA	577
Sony	650

To ensure correct operation

- Place the Cable Mouse so that it hangs out over the cable box/DSS receiver front.
- Do not place the cable box/DSS receiver on top of the VCR.
- Position the cable box/DSS receiver away from the VCR.
- Point the remote commander at the VCR, not at the cable box/DSS receiver.



Side view

Signal flow

To check the cable box control setting

- Press CH +/- on the remote commander. Does the channel indicator on the cable box/DSS receiver change? (Point the remote commander at the VCR, not at the cable box/DSS receiver.)
- Press all 10 number buttons (0 to 9) on the remote commander. Does the channel indicator on the cable box/DSS receiver change?

If the answer to both 1 and 2 is "yes," you have made the correct setting.

continued

Getting Started

Setting up cable box control (continued)

If you cannot get your VCR to control the cable box/DSS receiver

- Check that the Cable Mouse is connected to the CABLE BOX CONTROL jack on the VCR.
- Check the position of the Cable Mouse.
- Place the cable box/DSS receiver and VCR away from each other. Do not place the cable box/DSS receiver on top of the VCR.
- Try the setup again making sure to use the correct control code. If the cable box still does not respond, try the other codes that are listed.

If your cable box still does not operate with the Cable Mouse, contact your cable company to see if they can provide you with a compatible cable box.

Note

- Make sure you turn off the VCR when you plug in or unplug the Cable Mouse. If you unplug the Cable Mouse and plug it in again, turn on the VCR before you use the cable box/DSS receiver control feature.

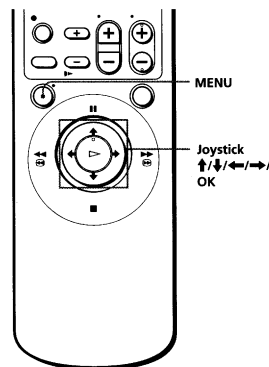
Presetting channels

(Skip this section if you are using cable box/DSS receiver control.)

This VCR is capable of receiving VHF channels 2 to 13, UHF channels 14 to 69 and unscrambled CATV channels 1 to 125. First, we recommend that you preset the receivable channels in your area using automatic presetting. Then, if there are any unwanted channels, disable them manually. If you have decided which channels you wish to preset, set them directly using manual presetting.

Before you start...

- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VIDEO to display the VIDEO indicator in the VCR's display window.



Getting Started

Presetting all receivable channels automatically

- Press MENU, then push the joystick to ↑/↓ to move the cursor (P) to TUNER PRESET and press the joystick (OK).
When using the EASY SET UP procedure, skip this step.

TUNER PRESET	CH1
ANTENNA / CABLE	ANT + CABLE
AUTO PRESET	ADD ERASE
MANUAL SET	ON OFF
FINE TUNING	

- Push the joystick to ↑/↓ to select ANTENNA/CABLE.

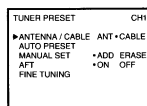
continued

Presetting channels (continued)

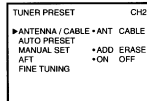
3



- To preset cable TV channels:
Push the joystick to \leftarrow/\rightarrow to set ANTENNA/CABLE to CABLE.



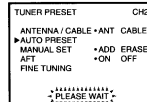
- To preset VHF and UHF channels:
Push the joystick to \leftarrow/\rightarrow to set ANTENNA/CABLE to ANT.



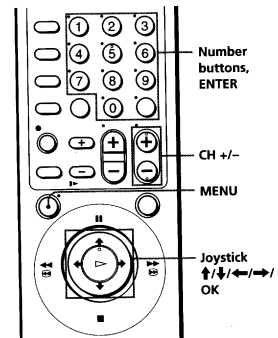
4



- Push the joystick to \uparrow/\downarrow to select AUTO PRESET, then press the joystick (OK).
All receivable channels are preset in numerical sequence. When no more receivable channels can be found, presetting stops and the picture from the lowest numbered channel is displayed on the TV screen.



Presetting/disabling channels manually

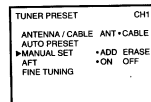


Getting Started

1



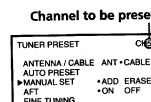
- Press MENU and select TUNER PRESET, then press the joystick (OK).



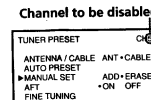
2



- To preset a channel:
1 Press the number buttons to enter the channel number, then press ENTER.
2 Push the joystick to \leftarrow/\rightarrow to set MANUAL SET to ADD.



- To disable a channel:
1 Press CH +/- to select the channel number.
2 Push the joystick to \leftarrow/\rightarrow to set MANUAL SET to ERASE.



3



- Repeat step 2 to preset or disable channels as required, then press the joystick (OK).

continued

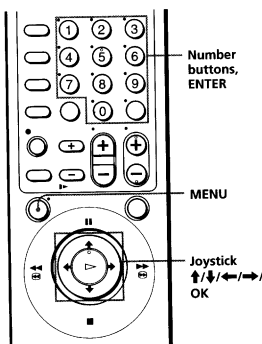
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Presetting channels (continued)

If the picture is not clear

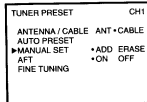
Normally, the Auto Fine Tuning (AFT) function automatically tunes in channels clearly. If, however, the picture of a channel is not clear, you can also use the manual tuning function.



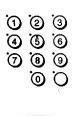
1



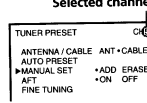
- Press MENU and select TUNER PRESET, then press the joystick (OK).



2



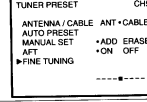
- Press the number buttons to select the channel you want to fine-tune, then press ENTER.



3



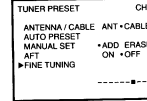
- Push the joystick to \uparrow/\downarrow to select FINE TUNING.
The fine tuning meter appears.



4



- Push the joystick to \leftarrow/\rightarrow to adjust to a clearer picture, then press the joystick (OK).
Note that the AFT setting switches to OFF.



Setting up VCR Plus+

How VCR Plus+ works

Whenever you want to record a TV program, all you need to do is look up the program's "PlusCode," a number assigned to each program that's published in the TV section of most newspapers, cable TV listings, and even TV GUIDE magazine. Then, just enter the PlusCode of the program you want and the VCR is automatically programmed to record that show. It's that simple.

How to set up your VCR

Setting up your VCR involves coordinating the TV channel number (the number you turn to on your TV or VCR to watch a program) with the guide channel (the number that's assigned to that channel in your program guide). To get the guide channel numbers, find the "Channel Line-up Chart" in the program guide for your area that features VCR PlusCodes. It usually looks like the example to the right.

For each channel your VCR receives, use the Channel Line-up Chart to check that the channel numbers match. For example, if HBO is listed in the Channel Line-up Chart on channel 33, and your VCR receives HBO on channel 5, you need to coordinate these numbers using the following procedure. For channels in which the numbers are the same, you can skip this procedure.

Example of "PlusCode"

Time	Program	PlusCode
5:30	MOVIE - Musical (2hrs.)	83044
6:30	SPORT - Golf (1hr. 25min.)	42060
	CNN - WS 9974	
6:30	DRAMA - Comedy (2hrs.)	17390
	SCIENCE AND TECHNOLOGY (1hr. 15min.)	73457

Example of "Channel Line-up Chart"

CABLE CH	CABLE TV	VCR Plus+ GUIDE CH
16	AMC American Movie Classics	35
17	Bravo (program grid only)	54
20	CNN Cable News Network	42
21	CSP C-SPAN	28
22	DIS The Disney Channel	53
25	DISC The Discovery Channel	37
34	ESPN ESPN	34
35	FAM The Family Channel	47
5	HBO Home Box Office	33
27	LIF Lifetime	46
29	MAX Comedy	45
30	MTV Music Television	48
31	NBC Nightline	38
38	SC Sports Channel	59
39	SCA Sports Channel America	70
45	SNO Showtime	41
17	TBS TBS SuperStation	43
44	TMC The Movie Channel	58
49	TNN The Nashville Network	49
50	TNT Turner Network Television	52
51	USA USA Network	44

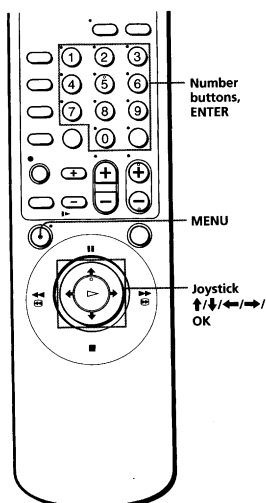
continued

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Setting up VCR Plus+ (continued)



- 1** Press MENU, then push the joystick to move the cursor (▶) to SET VCR PLUS+ CHANNELS and press the joystick (OK).

SET VCR PLUS+ CHANNELS
GUIDE CH TV CH
33 - 55
PUSH 0-9 KEYS TO SET
PROGRAM GUIDE CH
OR PUSH OK TO SEE
VCR PLUS+ CHANNEL LIST

- 2** Enter the channel number assigned in the program guide and press ENTER.

SET VCR PLUS+ CHANNELS
GUIDE CH TV CH
33 - 55
PUSH 0-9 KEYS TO SET
PROGRAM GUIDE CH
THEN PUSH ENTER

- 3**
- If you made Hookup 1, 2 or 3: Enter the actual number on your TV (and VCR) and press ENTER.
 - If you made Hookup 4: Enter the cable output channel (usually 2, 3 or 4) and press ENTER.
 - If you made Hookup 6: Enter the actual number on your TV (and VCR) for an unscrambled channel and press ENTER. For a scrambled channel, enter the cable box output channel (usually 2, 3, or 4) and press ENTER.

SET VCR PLUS+ CHANNELS
GUIDE CH TV CH
33 - 55
PUSH 0-9 KEYS TO SET
PROGRAM TV CH
THEN PUSH ENTER

SET VCR PLUS+ CHANNELS
GUIDE CH TV CH
33 - 55
PUSH 0-9 KEYS TO SET
PROGRAM TV CH
THEN PUSH ENTER

- 4** Repeat steps 2 and 3 for each channel whose numbers don't match.

- 5** When you have set all channels, press the joystick (OK) to confirm your channel settings.



VCR PLUS+ CHANNEL LIST
PAGE 1
GUIDE TV GUIDE TV
2 - 73 59 - 47
5 - 4 61 - 3
17 - 55 77 - 35
28 - 9 66 - 130
33 - 5 90 - 22
USE ◀▶ TO CHANGE PAGE
PUSH MENU TO QUIT

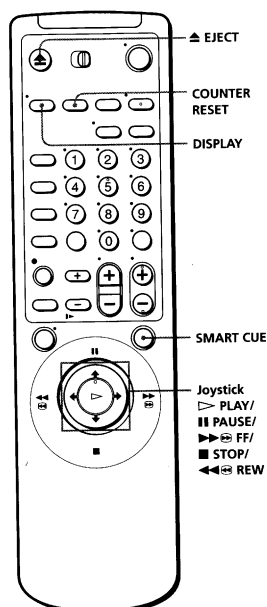
- 6** When you've finished, press MENU to exit.



Getting Started

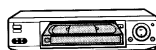
Basic Operations

Playing a tape



- 1** Turn on your TV and set it to the video channel.

- 2** Insert a tape.
The VCR turns on and starts playing automatically if you insert a tape with its safety tab removed.



- 3** Press the joystick ▶.
When the tape reaches the end, it will rewind automatically.

Additional tasks

To	Push the joystick to
Stop play	■ STOP
Pause play	⏸ PAUSE
Resume play after pause	⏸ PAUSE or press the joystick ▶.
Fast-forward the tape	⏭ FF during stop
Rewind the tape	⏮ REW during stop
Eject the tape	Press ▲ EJECT.

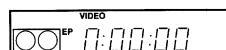
To skip playback

You can skip a portion of playback you don't want to watch such as a commercial and restart playback by pressing a single button.
Press SMART CUE during playback of a scene you want to skip. The VCR starts searching.

Press SMART CUE again when you find the scene you want to watch. The VCR stops searching, rewinds a few seconds, then resumes normal playback.

To use the time counter

At the point on the tape that you want to find later, press COUNTER RESET. The counter in the display window resets to "0:00:00." Search for the point afterwards by referring to the counter.



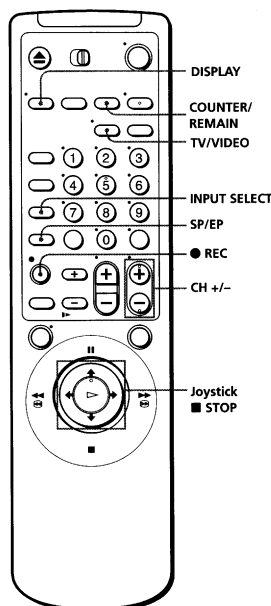
To display the counter on the TV screen, press DISPLAY.

Notes

- Tapes recorded in the LP mode on other VCRs can be played back on this VCR but the picture quality cannot be guaranteed.
- While setting the menu on the TV screen, you cannot use the joystick for tape operation.
- The counter resets to "0:00:00" whenever a tape is reinserted.
- The counter stops counting when it comes to a portion with no recording.

Basic Operations

Recording TV programs



- 1 Turn on your TV and set it to the video channel.
To record from a cable box, turn it on.
- 2 Insert a tape with its safety tab in place.

- 3 **INPUT SELECT** Press INPUT SELECT until a channel number appears in the display window.
- 4 **CH +/-** Press CH +/- to select the channel you want to record.
- 5 **SP / EP** Press SP / EP to select the tape speed, SP or EP.
EP (Extra Play) provides recording time three times as long as SP (Standard Play), however, SP produces better picture and audio quality.
- 6 **REC** Press **REC** to start recording.
The recording indicator lights up red in the display window.
Recording indicator

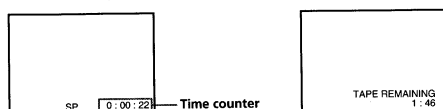
To stop recording
Push the joystick to **STOP**.

continued

Recording TV programs (continued)

To check the remaining time

Press DISPLAY. With the display on, press COUNTER/REMAIN to check the remaining time. Each time you press COUNTER/REMAIN, the time counter and the remaining time appear alternately. The remaining time indicator also appears in the display window.



To check the remaining time of a T-140 or T-180 tape, set TAPE SELECT in the ADVANCED OPTIONS menu to "180." (For details, see page 73.)

To watch another TV program while recording

- 1 Press TV/VIDEO to turn off the VIDEO indicator in the display window.
- 2 If the TV is connected to the VCR's LINE OUT jacks, set the TV to TV input; if not, skip this step.
- 3 Select another channel on the TV.

To select the channel using the shuttle ring

To select a channel in step 4 on page 53, you can also use the shuttle ring. During stop, turn the shuttle ring clockwise for higher channels or counterclockwise for lower channels. The VCR switches the channel in the preset order.

To save a recording

To prevent accidental erasure, break off the safety tab as illustrated. To record on a tape again, cover the tab hole with adhesive tape.



Tips

- To select a channel, you can use the number buttons on the remote commander. Enter the channel number, then press ENTER.
- You can select a video source from the LINE-1 IN or LINE-2 IN jacks using INPUT SELECT.
- The display appears on the TV screen indicating information about the tape, but the information won't be recorded on the tape.
- If you don't want to watch TV while recording, you can turn off the TV. When using a cable box, make sure to leave it on.

Notes

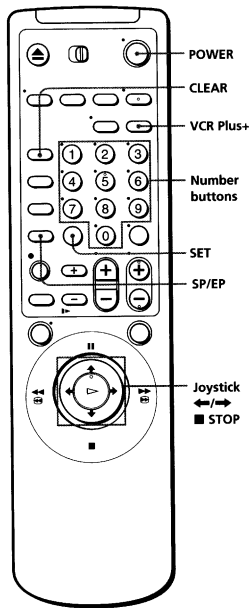
- The remaining time may not be indicated accurately for:
 - short tapes less than T-20
 - T-130
 - T-210
 - tapes recorded in the LP mode.
- The display doesn't appear during still (pause) mode, search mode, or slow-motion playback.
- It may take up to one minute for the VCR to calculate and display the remaining time after you press DISPLAY.

Recording TV programs using VCR Plus+

Just enter the program's PlusCode listed in the TV program guide. The date, times and channel number of that program are set automatically. You can preset up to eight programs at a time.

Before you start...

- Check that the VCR clock is set to the correct time.
- Turn on your TV and set it to the video channel. When using a cable box, turn it on.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.



- 1** Press VCR Plus+.

VCR PLUS+	PLUSCODE	SP/EP
	8912----	SP
ENTER PROGRAM'S PLUSCODE USING 0-9 KEYS		
TO CHANGE TAPE SPEED PUSH SP/EP		

- 2** Press the number buttons to enter the program's PlusCode.
If you make a mistake, press CLEAR and re-enter the correct number.

VCR PLUS+	PLUSCODE	SP/EP
	8912----	SP
USE KEYS FOR:		
• ONCE DAILY WEEKLY		
TO CONFIRM	SET	
TO CANCEL	CLEAR	

- 3** Press SP/EP to select the tape speed, SP or EP.

VCR PLUS+	PLUSCODE	SP/EP
	8912----	EP
USE KEYS FOR:		
• ONCE DAILY WEEKLY		
TO CONFIRM	SET	
TO CANCEL	CLEAR	

- 4** Push the joystick to select ONCE, DAILY, or WEEKLY, then press SET:

To record	Select
Only once	ONCE
Everyday Monday to Friday	DAILY
Once a week	WEEKLY

The date, start and stop times, channel number and tape speed appear on the TV screen. If the information is not correct, press CLEAR to cancel the setting.

VCR PLUS+	PLUSCODE	SP/EP
	8912----	EP
RECORDING TIME		
DATE	START	STOP CH
11/17	TU 10:00M	11:00M 60P
TO SET TIMER: PUSH POWER		
TO CANCEL: PUSH CLEAR		

- 5** To enter another setting, repeat steps 1 to 4.

- 6** Press POWER to turn off the VCR.
The indicator appears in the display window and the VCR stands by for recording. When using a cable box, leave it on.

To stop recording

To stop the VCR while recording, push the joystick to STOP.

continued

Recording TV programs using VCR Plus+ (continued)

To use the VCR after setting the timer

To use the VCR before a timer recording begins, just press POWER. The indicator turns off and the VCR switches on. Remember to press POWER to reset the VCR in timer recording standby after using the VCR.

You can also do the following tasks while the VCR is recording:

- Reset the counter.
- Display tape information on the TV screen.
- Check the timer settings.
- Watch another TV program.

To lock the VCR after setting the timer (Child Lock)

While the VCR turns on, hold POWER down on the VCR until the indicator appears in the display window. The VCR turns off and the indicator remains lit. The VCR will not work except for timer recording.

To unlock the VCR, hold POWER down on the VCR until the indicator disappears from the display window. The VCR is unlocked and turns on.

To stop timer recording while the VCR is locked, press STOP. The recording stops and the VCR is unlocked.

Tip

- To cancel the VCR Plus+ recording, press VCR Plus+ before pressing SET in step 4 on page 57.

Note

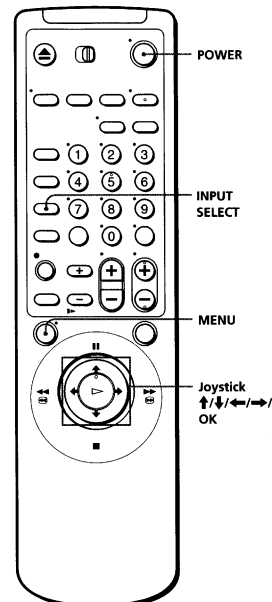
- If the VCR doesn't accept the PlusCode, this means that:
 - The PlusCode is incorrect.
 - ONCE, DAILY, or WEEKLY was selected incorrectly. You cannot select DAILY or WEEKLY for a program that airs more than seven days ahead.

Setting the timer manually

If VCR Plus+ is not available in your area, follow the instructions below to set the timer to record programs.

Before you start...

- Check that the VCR clock is set to the correct time.
- Turn on your TV and set it to the video channel. When using a cable box, turn it on.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.








- 1** Press MENU and select TIMER SET/CHECK, then press the joystick (OK).


TIMER SET / CHECK	11/18 MO
DATE	START STOP CH
11/18	10:00M 11:00M 60P
11/19	10:00M 11:00M 60P
11/20	10:00M 11:00M 60P
11/21	10:00M 11:00M 60P
11/22	10:00M 11:00M 60P
11/23	10:00M 11:00M 60P
11/24	10:00M 11:00M 60P
11/25	10:00M 11:00M 60P
11/26	10:00M 11:00M 60P
11/27	10:00M 11:00M 60P
11/28	10:00M 11:00M 60P
11/29	10:00M 11:00M 60P
11/30	10:00M 11:00M 60P







continued

Setting the timer manually (continued)




- 2  Set the date, start and stop times, channel number and tape speed:
 - 1 Push the joystick to  to flash each item in turn.
 - 2 Push the joystick to / to set each item.

To correct a setting, push the joystick to  to return to that setting and reset.

To record the same program every day or the same day every week, push the joystick to  while the date is flashing. For details, see "Daily/weekly recording" on this page.

To record from a source connected to the LINE 1 IN or LINE 2 IN jacks, press INPUT SELECT to display "L1" or "L2" in the "CH" position.
- 3  Push the joystick to  to confirm the setting. The cursor () appears at the beginning of the line. To enter another setting, move the cursor to the next line and repeat step 2.
- 4  Press the joystick (OK).
- 5  Press POWER to turn off the VCR. The  indicator appears in the display window and the VCR stands by for recording. When using a cable box, leave it on.

Daily/weekly recording

In step 2 above, push the joystick to  to select the recording pattern. Each time you push the joystick to , the indication changes as shown below. Push the joystick to  to change the indication in reverse order.

the current date → SU-SA → MO-SA → MO-FR → EVERY SA → → EVERY MO → EVERY SU → 1 month later → (dates count down) → the current date

Tips

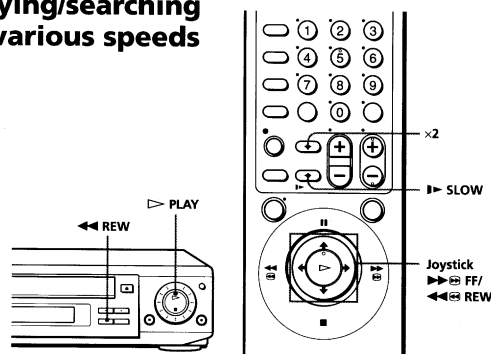
- To set the channel, you can also use the CH+/-, number buttons, or shuttle ring during stop.
- To set the tape speed, you can also use SP/EP.












Note

- If you are using cable box control, you cannot select "L1" or "L2".

Additional Operations

Playing/searching at various speeds



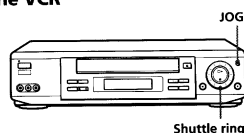
Playback options	Operation
View the picture during fast-forward or rewind	During fast-forward, keep pushing the joystick to  FF. During rewind, keep pushing the joystick to  REW.
Play at high speed	<ul style="list-style-type: none"> During playback, push the joystick to  FF or  REW on the remote commander. During playback, keep pushing the joystick to  FF or  REW. When you release the joystick, normal playback resumes.
Play at twice the normal speed	During playback, press x2.
Play in slow motion	During playback or pause, press  SLOW.
Play frame by frame	During pause, push the joystick to  FF or  REW. Keep pushing the joystick to play one frame each second.
Rewind and start play	During stop, hold  REW on the VCR, and press  PLAY on the VCR.

continued

Playing/searching at various speeds (continued)

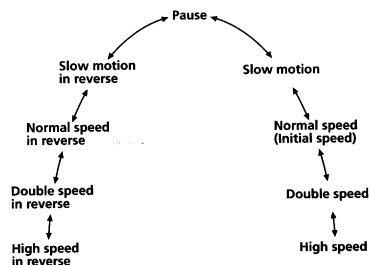
Using the shuttle ring on the VCR

With the shuttle ring on the VCR, you can operate a variety of playback options. There are two ways for using the shuttle ring, normal mode and jog mode.



To use the shuttle ring in normal mode

During playback or pause, turn the shuttle ring clockwise or counterclockwise. Each change in the shuttle ring position changes the playback mode in the following way.




To use the shuttle ring in jog mode

Use this mode for frame-by-frame playback.

Press JOG to enter the jog mode. The JOG button lights up. If you change to the jog mode during any playback mode, the playback pauses so you can see a still picture. Each change in the shuttle ring position shifts the picture one frame. To shift frames in reverse, turn the shuttle ring counterclockwise. The frame shift speed depends on the speed you turn the shuttle ring. To resume normal playback, press JOG again. The JOG indicator goes off.

To resume normal playback

Press the joystick .

Tip

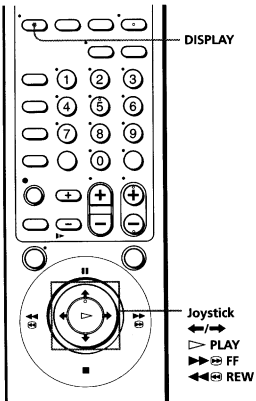
- Adjust the picture using the TRACKING +/- buttons on the VCR if:
 - Streaks appear while playing in slow motion.
 - The picture shakes while pausing.

Notes

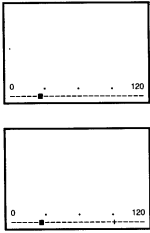
- The sound is muted during these operations.
- Tapes recorded in the LP mode on other VCRs can be played back on this VCR but the picture quality cannot be guaranteed.
- The picture may have snow:
 - when playing at high speed in reverse
 - when playing in reverse slow motion
 - when playing in reverse.
- On screen symbols, such as the bar indication, may shake while playing or searching at various speeds.

Searching for a selected point on the tape

You can easily find a selected point by moving the pointer on the TV screen. The VCR fast-forwards or rewinds to the point you indicate and starts playback automatically.



- 1 Press DISPLAY repeatedly until the bar indication appears on the TV screen. A cursor (■) indicating the current position of the tape appears on the bar indication. If the cursor does not appear, play the tape a few moments (by pushing the joystick to ▷ PLAY, ►► FF or ◀◀ REW) until the cursor appears.
- 2 Push the joystick to ◀/▶ to move the pointer (+) to the point where you want to start playback. The VCR starts searching and the cursor (■) moves toward the pointer. When the VCR locates the marked point, playback starts.



To cancel searching
Push the joystick to ▷ PLAY or STOP ■.

To turn off the bar indication
Press DISPLAY again.

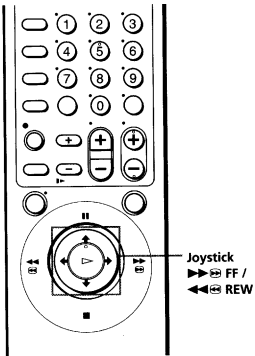
- Notes**
- The figure on the bar indication represents the total time length of the inserted tape as shown below. The total time length may not be displayed correctly for:
 - tapes other than T-60, T-120, or T-160
 - tapes recorded in more than one tape speed mode.

Tape type	Total time length		
	SP	LP	EP
T-60 or shorter	60	120	180
from T-80 to T-140	120	240	360
T-160 or longer	160	320	480

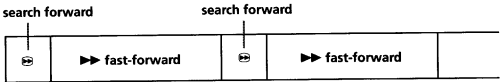
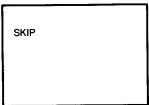
- If you move the pointer (+) on the bar indication during search, the VCR searches for the new reset point.
- While the cursor (■) is displayed on the bar indication, the joystick (►► FF / ◀◀ REW / ◀▶) on the remote commander work only for moving the pointer (+), while the ►► FF and ◀◀ REW buttons on the VCR work for normal tape operation. Note, however, if you press these buttons on the VCR, searching is canceled.

Skip-searching automatically

You can spot check a whole tape quickly. At intervals, the VCR skips playback while searching forward or backward.



Push the joystick to ►► FF (or ◀◀ REW) for two seconds during stop. "SKIP" indicator appears on the TV screen. The VCR searches forward (or backward) for two minutes on the counter, then fast-forwards (or rewinds) for ten minutes on the counter. The VCR repeats this operation until it stops at the end (or beginning) of the tape.

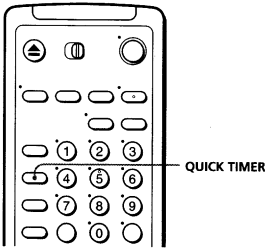


To cancel skip-search
Push the joystick to ▷ PLAY or STOP ■.

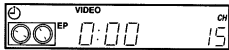
- Note**
- The VCR automatically fast-forwards (or rewinds) any portion with no recording.

Recording TV programs using the quick timer

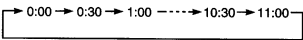
After starting recording in the normal way, you can have the VCR stop recording automatically after a specified duration.



- 1 While recording, press QUICK TIMER once. The ⊕ indicator appears in the display window.



- 2 Press QUICK TIMER repeatedly to set the duration. Each press advances the time in increments of 30 minutes.



The duration decreases minute by minute to 0:00, then the VCR stops recording and turns off automatically.

- To extend the duration**
Press QUICK TIMER repeatedly to set to the new duration.
- To stop the VCR while recording**
Push the joystick to STOP ■.

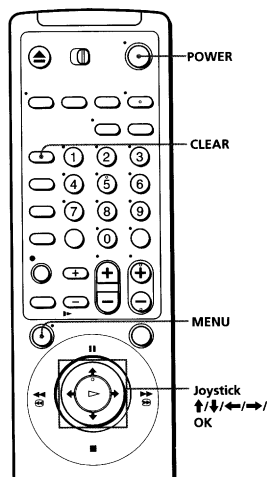
Using the quick timer during stop mode

- 1 Press QUICK TIMER.
- 2 Press CH +/- or INPUT SELECT to select the channel you want to record.
- 3 Press QUICK TIMER repeatedly to set the recording duration. The recording starts.

Checking/ changing/ canceling timer settings

Before you start...

- Turn on your TV and set it to the video channel.

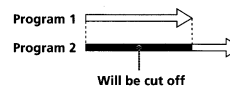


- 1 Press POWER to turn on the VCR.
- 2 Press MENU and select TIMER SET/CHECK:
 - If you want to change a setting, go on to the next step.
 - If you do not need to change the settings, press the joystick (OK), then turn off the VCR to return to recording standby.
- 3 Push the joystick to \uparrow/\downarrow to select the setting you want to change or cancel:
 - To change the setting, push the joystick to \leftarrow/\rightarrow to flash the item you want to change, and push the joystick to \uparrow/\downarrow to reset it. Then, push the joystick to \rightarrow repeatedly until the cursor (\blacktriangleright) appears at the beginning of the line.
 - To cancel the setting, press CLEAR.
- 4 Press the joystick (OK).

TIMER SET/CHECK	11/16 MO
DATE	START STOP CH
11/17 TU	7:00W 8:00W 6P
11/25 WE	10:30W 11:15W 50P
MO - SA	1:00W 3:00W L1P
EVERY SU	11:55W 1:30W 42P
--/--	--/--
--/--	--/--
--/--	--/--

When the timer settings overlap

The program that starts first has priority and the second program starts recording only after the first program has finished. If the programs start at the same time, the program listed first in the menu has priority.



Recording stereo and bilingual programs

Recording stereo programs

This VCR automatically receives and records stereo programs. When a stereo program is received, the STEREO indicator lights up. If there is noise in the stereo program, set AUTO STEREO in the ADVANCED OPTIONS menu to OFF. The sound will be recorded in monaural (on both hi-fi and normal audio tracks) but with less noise. For details, see page 73.

Recording bilingual programs

Normally, this VCR records only the main sound. When a SAP (Second Audio Program) is received, the SAP indicator lights up. To record only SAP sound, set TUNER AUDIO in the ADVANCED OPTIONS menu to SAP. For details, see page 73.

Selecting the sound while playing

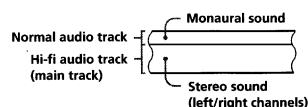
Press AUDIO MONITOR to select the desired sound. (The sound being recorded will not change.)

To listen to	Indicator on the TV screen
Stereo	STEREO
Left channel	L
Right channel	R
Monaural sound on the normal audio track*	No indicator appears

* Usually the mixed sound of left and right channels

How sound is recorded on a video tape

The VCR records sound onto two separate tracks. Hi-fi audio is recorded onto the main track along with the picture. Monaural sound is recorded onto the normal audio track along the edge of the tape.





Notes

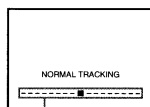
- To play a tape in stereo, you must use the A/V connections.
- When you play a tape recorded in monaural, the sound is heard in monaural regardless of the AUDIO MONITOR setting.

Adjusting the picture

Adjusting the tracking

Although the VCR automatically adjusts the tracking when playing a tape (the  indicator flashes in the display window, then goes off), distortion may occur if the tape was recorded in poor condition. In this case, manually adjust the tracking.

Press the TRACKING +/- buttons on the VCR to display the tracking meter. The distortion should disappear as you press one of the two buttons (the  indicator lights up). To resume automatic tracking adjustment, eject the tape and reinsert it.



Tracking meter

About Adaptive Picture Control (APC)

Adaptive Picture Control (APC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you set APC to ON in the ADVANCED OPTIONS menu (with the APC indicator in the display window lit). For details, see page 73.




APC playback

The APC function automatically works on all types of tapes, including rental tapes and tapes that were not recorded with APC.

APC recording

Whenever you insert a tape and first start recording, the VCR adjusts to the tape using the APC function (the APC indicator flashes rapidly). This adjustment is retained until the tape is ejected.





Notes

- The auto tracking adjustment cannot be guaranteed to work with tapes recorded in the LP mode on other VCRs.
- When you set AUTO TAPE SPEED to ON in the ADVANCED OPTIONS menu, the APC function doesn't work if the tape speed is automatically changed from the SP to EP mode during a timer recording, unless the tape has been recorded in the EP mode with the APC function. For details, see page 73.
- There is a delay of a few seconds before the VCR actually starts recording while the VCR analyzes the tape. To avoid the delay, first set the VCR to recording pause (the APC indicator flashes slowly) and press  REC to have the VCR analyze the tape. After the APC indicator stops flashing, push the joystick to  PAUSE to start recording immediately. If you push the joystick to  PAUSE before the APC indicator stops flashing, the APC function is canceled.

Changing menu options

- Press MENU and select ADVANCED OPTIONS.

ADVANCED OPTIONS			
AUTO STEREO	ON	OFF	
TUNER AUDIO	MAIN	SAP	
APC	ON	OFF	
TAPE SELECT	AUTO	180	
AUTO TAPE SPEED	ON	OFF	
SHARPNESS	L	H	

- Push the joystick to  /  to select the option to change, then push the joystick to  /  to change the setting.
- Press the joystick (OK) to return to the original screen.

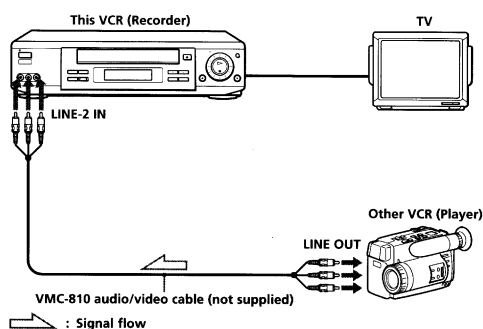
Menu choices

Initial settings are indicated in bold print.

Menu option	Set this option to
AUTO STEREO	ON to receive stereo programs. OFF to reduce noise; the sound changes to monaural.
TUNER AUDIO	MAIN to record the main sound on both hi-fi and normal audio tracks. SAP to record the SAP (Second Audio Program) sound on both hi-fi and normal audio tracks.
APC	ON to switch on the APC (Adaptive Picture Control) function and improve picture quality. OFF to switch off APC.
TAPE SELECT	AUTO or 180 (when using a T-140 or T-180) to select the tape length and display the remaining time correctly.
AUTO TAPE SPEED	ON to change the timer recording tape speed automatically to the EP mode when the remaining tape becomes shorter than the recording time. OFF to keep the set tape speed.
SHARPNESS	L (Low) through H (High) to adjust the sharpness of the picture. L to turn off the sharpness control.

Editing with another VCR

How to hook up to record on this VCR



How to hook up to a stereo system

Connect LINE-2 IN AUDIO on this VCR to the audio output jacks on the stereo system, using the RK-CS10KS audio cable (not supplied).

If the other VCR has a CONTROL S OUT jack for synchronized editing

Hook up to record on the other VCR, then connect the VCRs via the CONTROL S jacks. The CONTROL S connection lets you control (pause and release pause) both VCRs from the recording VCR.

Notes

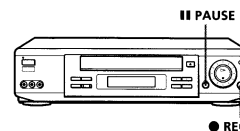
- Make sure you connect the plugs to jacks of the same color.
- If the other VCR is a monaural type and connected to this VCR's LINE-2 IN jacks, connect the audio plug to the AUDIO L (white) jack. The sound is recorded on both right and left channels. When connecting to the AUDIO R (red) jack, the sound is recorded only on the right channel.
- If you connected this VCR to both the LINE IN and LINE OUT jacks of the other VCR, select the input correctly to prevent a humming noise.
- You can also use the LINE-1 IN jacks instead. If the other VCR is a monaural type, the sound is recorded only on the channel whose jack is connected to the audio plug. To record on both right and left channels, connect the audio plugs to the AUDIO R/L jacks using a VMC-910MS audio/video cable (not supplied).




Operation

(when recording on this VCR)


Before you start editing

- Turn on your TV and set it to the video channel.
- Press INPUT SELECT to display "L1" or "L2" in the display window.
- Press SP/EP to select the tape speed, SP or EP.






- Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.
- Insert a tape with its safety tab in place into this (recording) VCR. Search for the point to start recording and press  PAUSE.
- Press  REC on this VCR and set it to recording pause.
- To start editing, press the  PAUSE buttons on both VCRs at the same time.

To stop editing

Press the  STOP buttons on both VCRs.

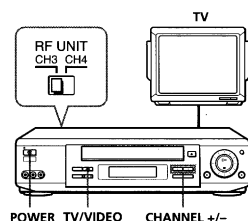
Note

- If you start recording following the procedure above, the VCR won't start recording with the APC function. To record a tape with the APC function, press  REC again during recording pause in step 3 so that the VCR analyzes the tape. Then when you start recording in step 4, press  PAUSE immediately after the APC indicator stops flashing. If you press  PAUSE before the APC indicator stops flashing, the APC function is canceled.

General setup information

Setting the RF unit

When connecting the VCR to the TV using only the antenna cable, you must set the RF UNIT switch on the rear of the VCR so that the TV can receive the correct signal from the VCR.



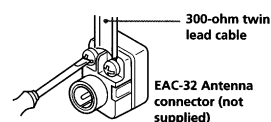
- 1 Set the RF UNIT switch on the rear of the VCR to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.
- 2 Press POWER to turn on the VCR.
- 3 Press TV / VIDEO to turn on the VIDEO indicator in the VCR's display window.
- 4 Press CHANNEL +/- to display a channel number in the display window. Select an active channel number in your area.
- 5 Turn on your TV and set it to the channel you selected in step 1 (channel 3 or 4).

The selected TV channel broadcast appears on the TV screen. If the channels change when you press CHANNEL +/-, you have made the correct setting.

Whenever you use the VCR, set the TV to the channel selected in step 1.

Attaching the external antenna connector

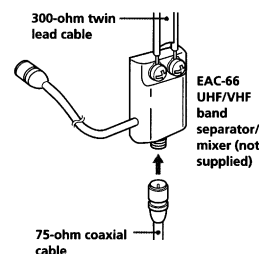
When using a 300-ohm twin lead cable for VHF / UHF antenna, use the EAC-32 antenna connector (not supplied) to connect the antenna to the VCR.



- 1 Loosen the screws on the antenna connector.
- 2 Wind the twin leads around the screws on the antenna connector.
- 3 Retighten the screws.

Attaching a UHF/VHF band mixer

When using both 75-ohm coaxial cable and 300-ohm twin lead cable for VHF / UHF antenna, use the EAC-66 UHF / VHF band separator / mixer (not supplied) to connect the antenna to the VCR.

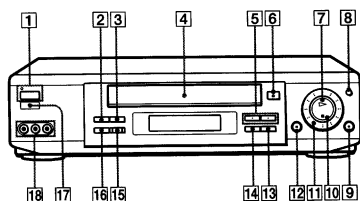


- 1 Loosen the screws on the mixer.
- 2 Wind the twin leads around the screws on the mixer.
- 3 Retighten the screws.
- 4 Connect the 75-ohm coaxial cable to the mixer.

Index to parts and controls

Refer to the pages indicated in parentheses () for details.

Front panel

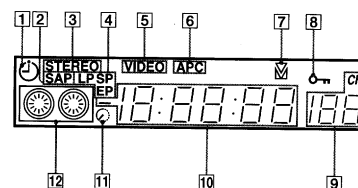


- | | |
|--|--|
| 1 POWER switch/indicator (57) | 10 ■ STOP button (51) |
| 2 SP (Standard Play)/EP (Extra Play) button (53, 57) | 11 Shuttle ring (54, 62) |
| 3 TV / VIDEO button (54) | 12 ■ PAUSE button (51) |
| 4 Tape compartment | 13 ►► FF (fast-forward) button (51, 61) |
| 5 CHANNEL/TRACKING +/- buttons (53, 72) | 14 ◀◀ REW (rewind) button (51, 61) |
| 6 ▲ EJECT button (51) | 15 EASY SET UP button (11, 14, 17, 20, 23, 26) |
| 7 ▷ PLAY button (51, 61) | 16 INPUT SELECT button (53, 55) |
| 8 JOG button (62) | 17 Remote sensor (5) |
| 9 ● REC (record) button (53, 75) | 18 LINE-2 IN VIDEO / AUDIO L / R jacks (74) |

continued

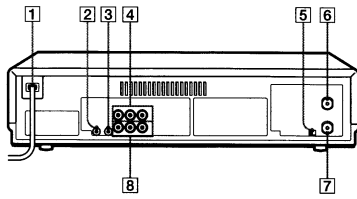
Index to parts and controls (continued)

Display window



- | | |
|-----------------------------|--|
| 1 Timer indicator (57) | 7 Tracking indicator (72) |
| 2 SAP indicator (70) | 8 Child Lock indicator (58) |
| 3 STEREO indicator (70) | 9 Line / channel indicator (53, 75) |
| 4 Tape speed indicator (53) | 10 Time counter / clock indicator (51) |
| 5 VIDEO indicator (54, 76) | 11 Remaining time indicator (54) |
| 6 APC indicator (72) | 12 Tape / recording indicator (53) |

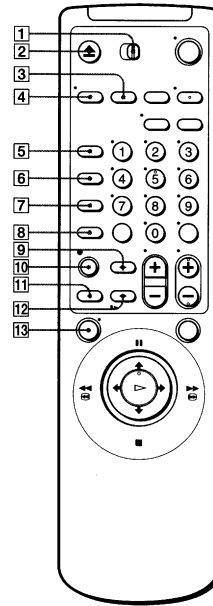
Rear panel



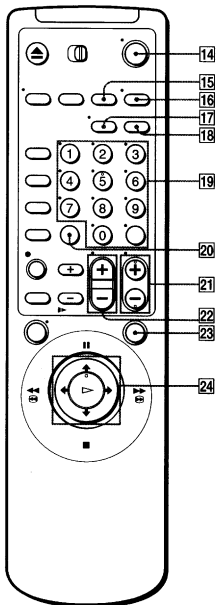
- 1 AC power cord (7)
- 2 S LINK (CONTROL S IN) jack (9)
- 3 CABLE BOX CONTROL (CONTROL S OUT) jack (10, 22)
- 4 LINE-1 IN AUDIO L/R/VIDEO jacks (22, 74)
- 5 RF (Radio Frequency) UNIT switch (76)
- 6 VHF/UHF IN connector (10, 13, 16, 19, 22, 25)
- 7 VHF/UHF OUT connector (10, 13, 16, 19, 22, 25)
- 8 LINE OUT AUDIO L/R/VIDEO jacks (8)

continued

Remote commander



- 1 TV/RECEIVER/VIDEO remote control switch (5)
- 2 EJECT button (51)
- 3 COUNTER RESET button (51)
- 4 DISPLAY button (54, 64)
- 5 CLEAR button (68)
- 6 QUICK TIMER button (67)
- 7 INPUT SELECT button (53, 60, 75)
- 8 SP (Standard Play)/EP (Extra Play) button (53)
- 9 x2/RECEIVER VOL (volume) + button (5, 61)
- 10 REC (record) button (53)
- 11 MUTING button (5)
- 12 SLOW/RECEIVER VOL (volume) - button (5, 61)
- 13 MENU button (30, 73)

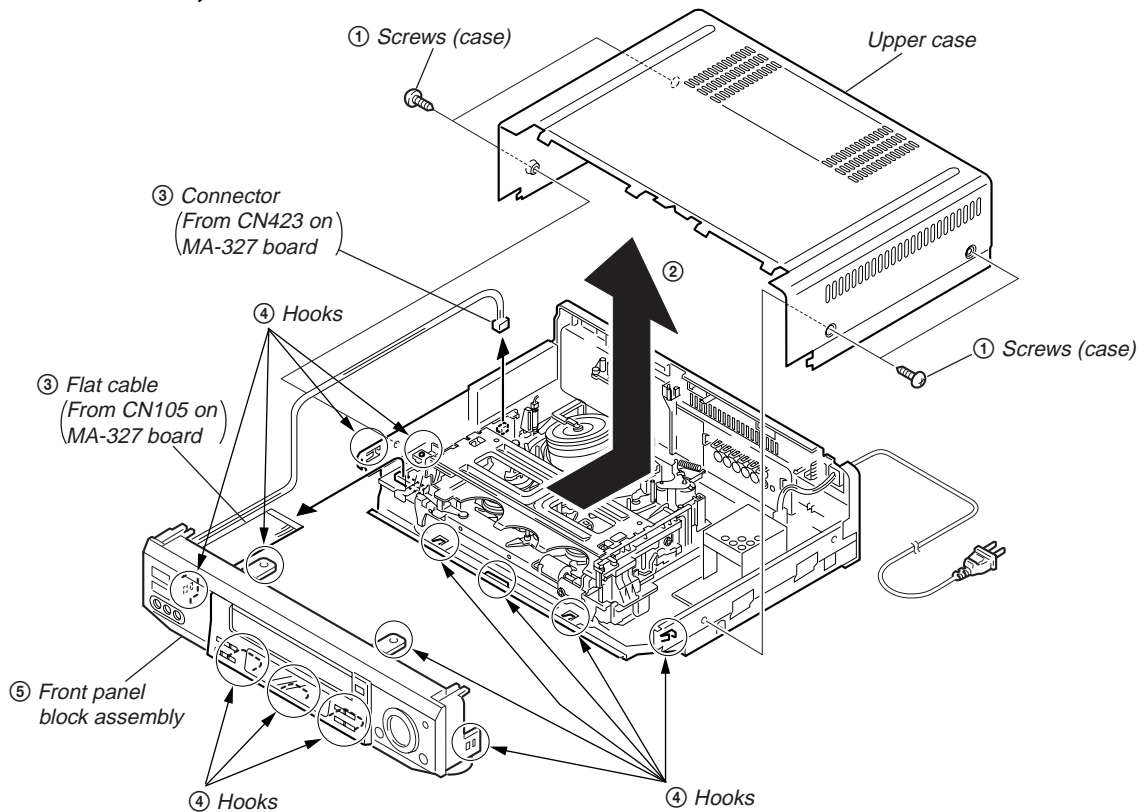


- 14 POWER switch (57)
- 15 COUNTER/REMAIN button (54)
- 16 AUDIO MONITOR button (70)
- 17 TV/VIDEO button (76)
- 18 VCR Plus+ button (56)
- 19 Number buttons and ENTER button (48, 57)
- 20 SET button (57)
- 21 CH (channel) +/- buttons (53)
- 22 VOL (volume) +/- buttons
- 23 SMART CUE button (51)
- 24 Joystick
 - > PLAY/OK (51, 61)
 - PAUSE/↑ (51)
 - STOP/↓ (51)
 - ◀◀ REW (rewind)/← (51, 61)
 - ▶▶ FF (fast-forward)/→ (51, 61)

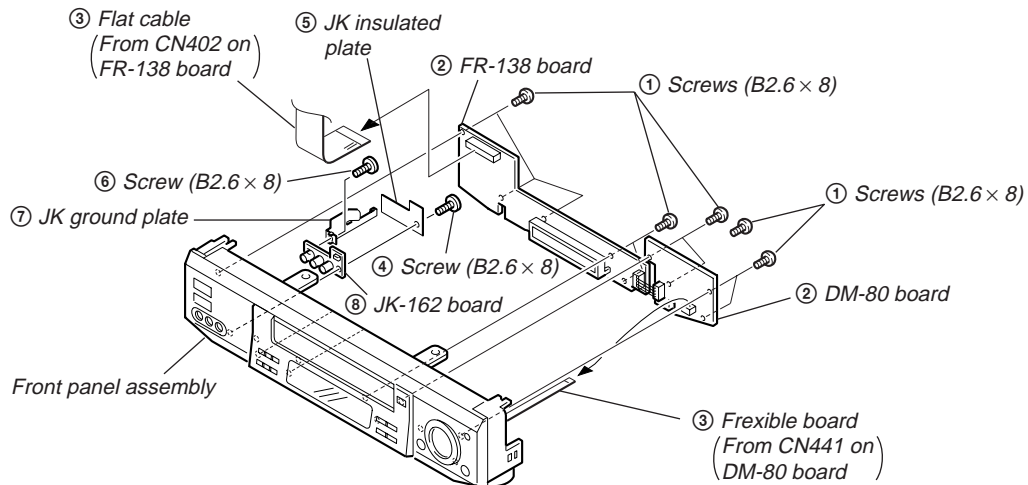
SECTION 2 DISASSEMBLY

NOTE: Follow the disassembly procedure in the numerical order given.

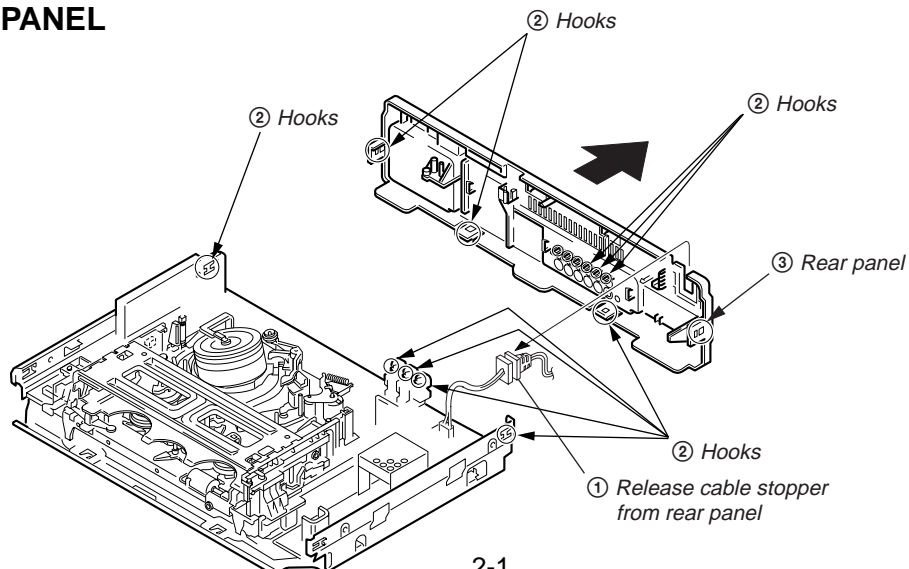
2-1. UPPER CASE, FRONT PANEL BLOCK ASSEMBLY



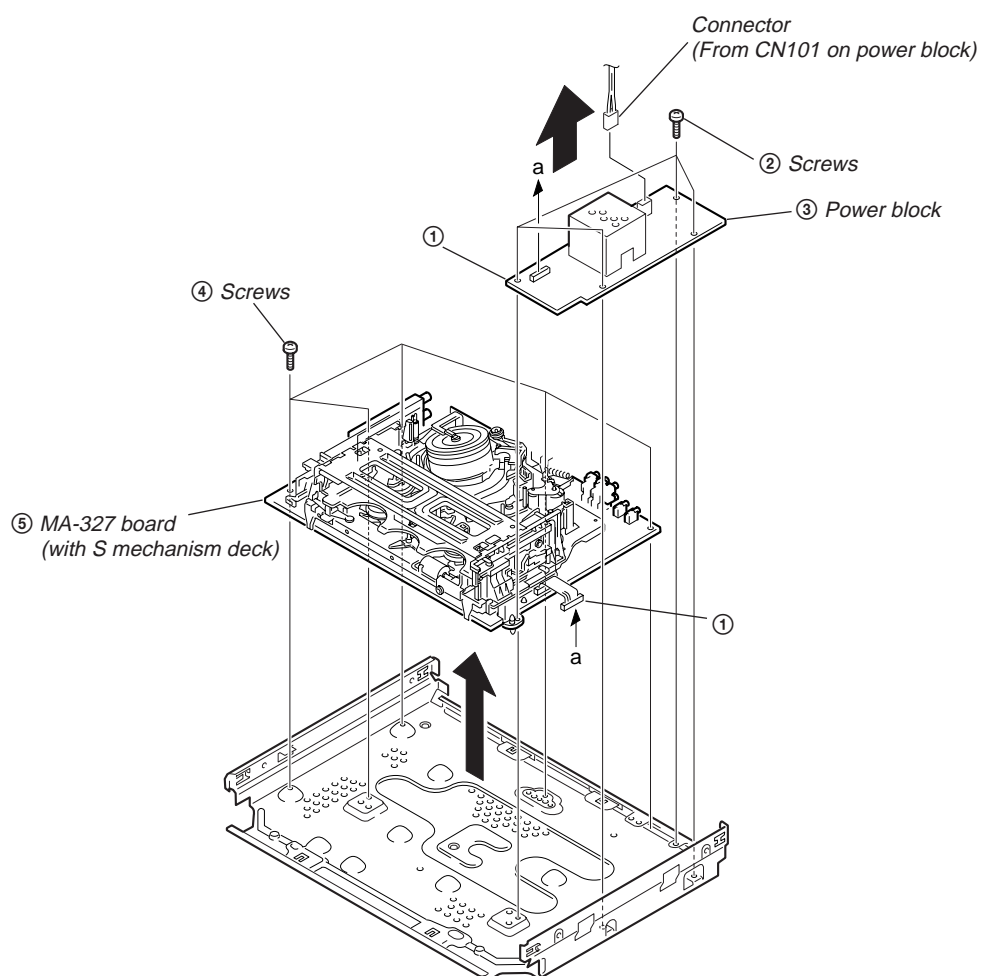
2-2. FR-138 BOARD, DM-80 BOARD



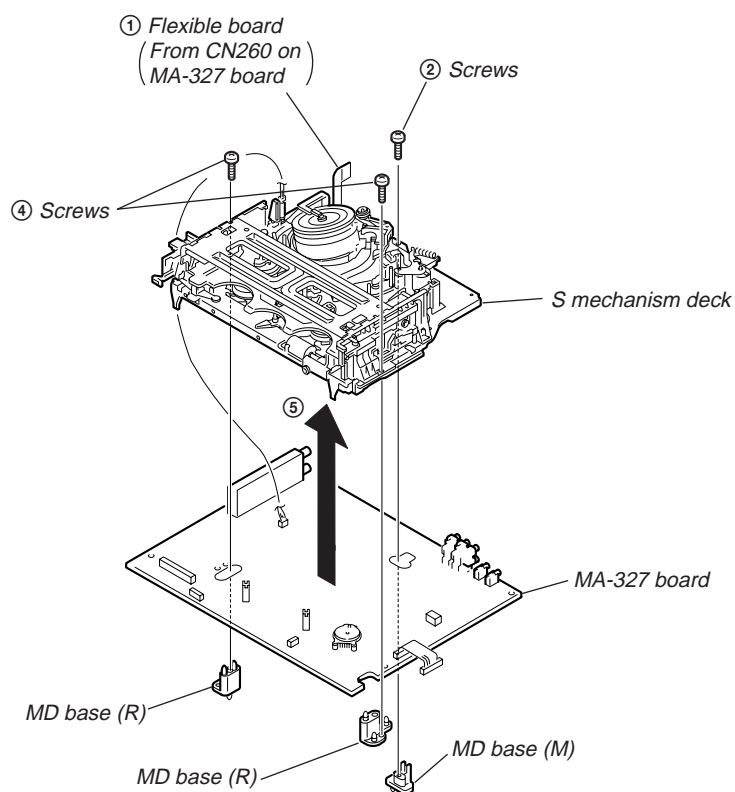
2-3. REAR PANEL



2-4. POWER BLOCK, MA-327 BOARD (WITH S MECHANISM DECK)

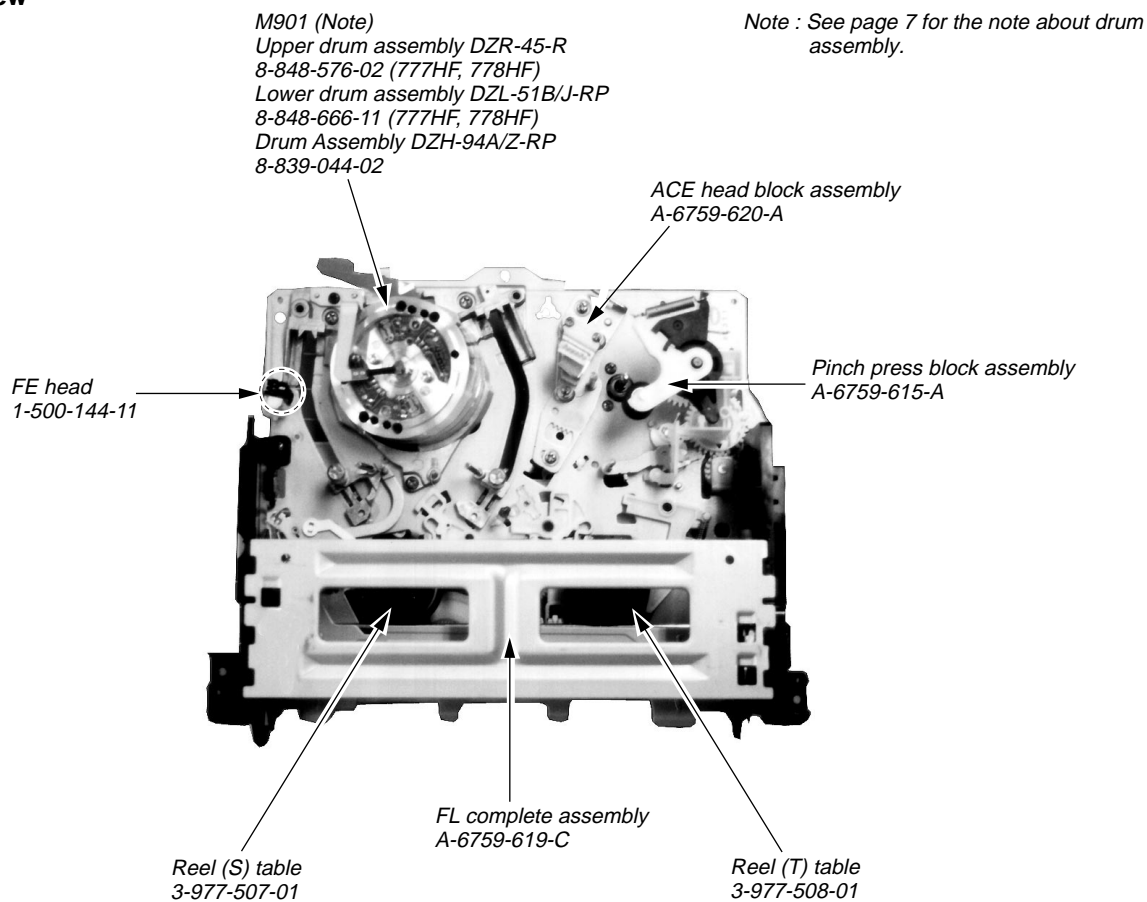


2-5. S MECHANISM DECK

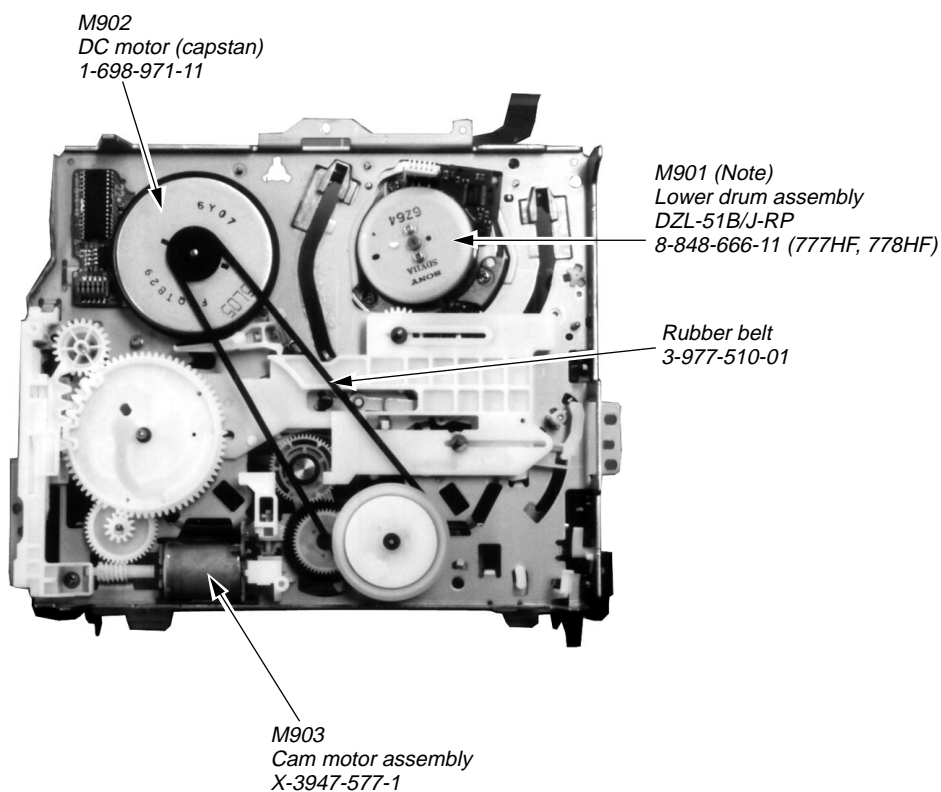


2-6. INTERNAL VIEWS

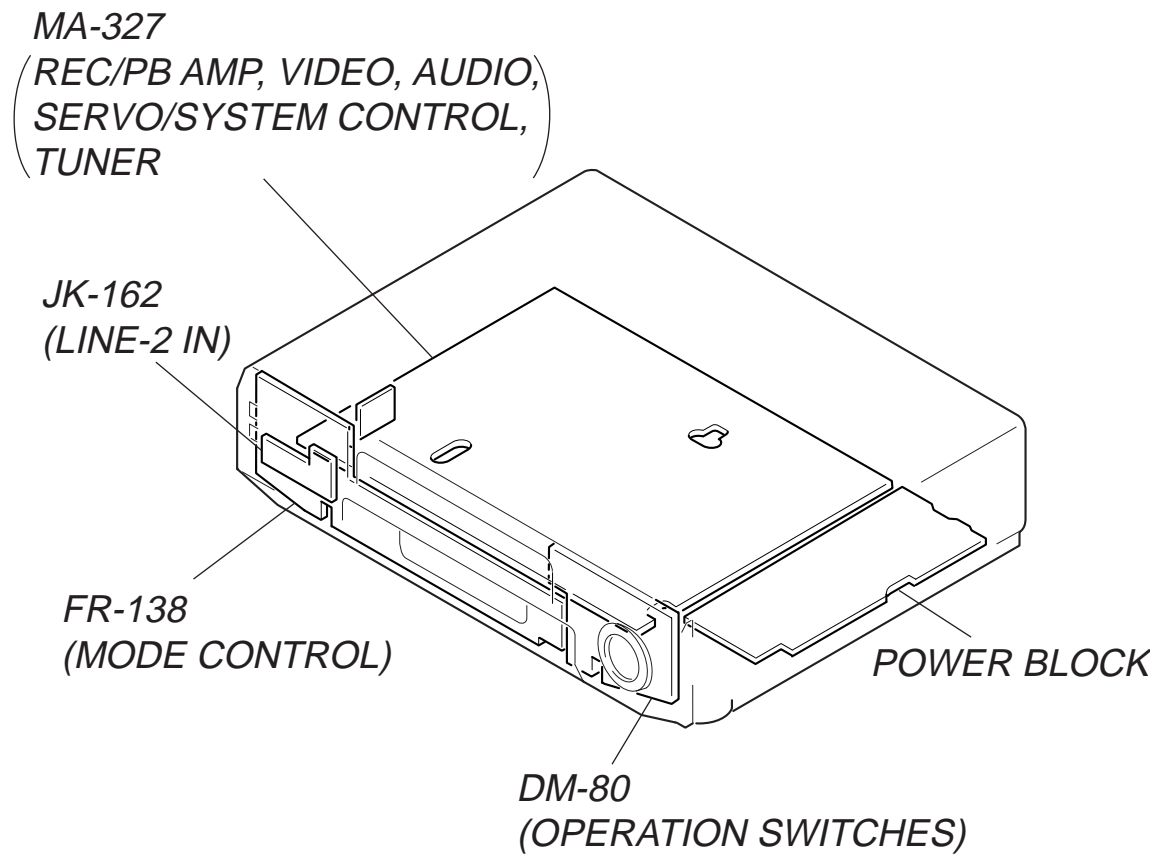
— Top View —



— Bottom View —

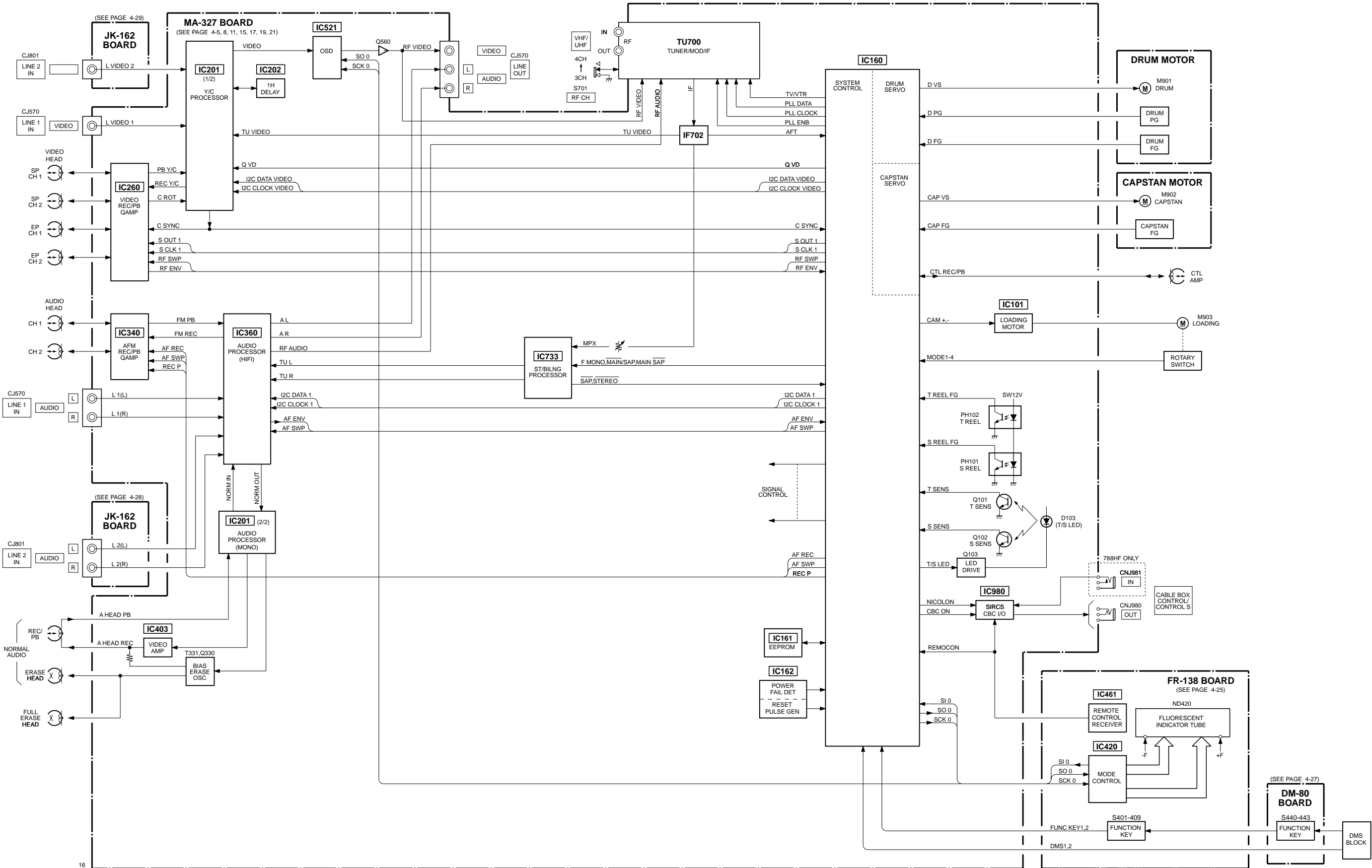


2-7. CIRCUIT BOARDS LOCATION



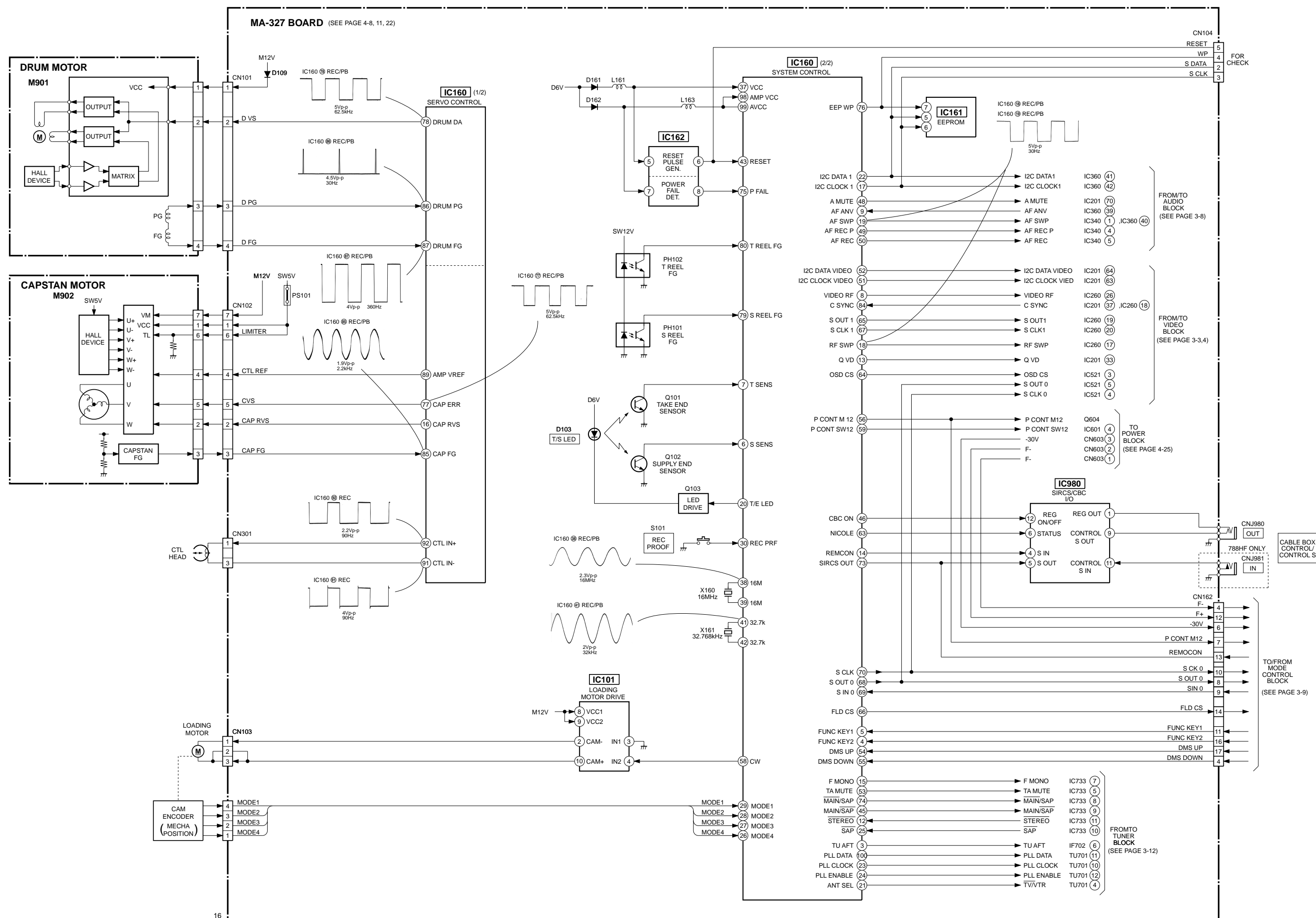
SECTION 3
BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM

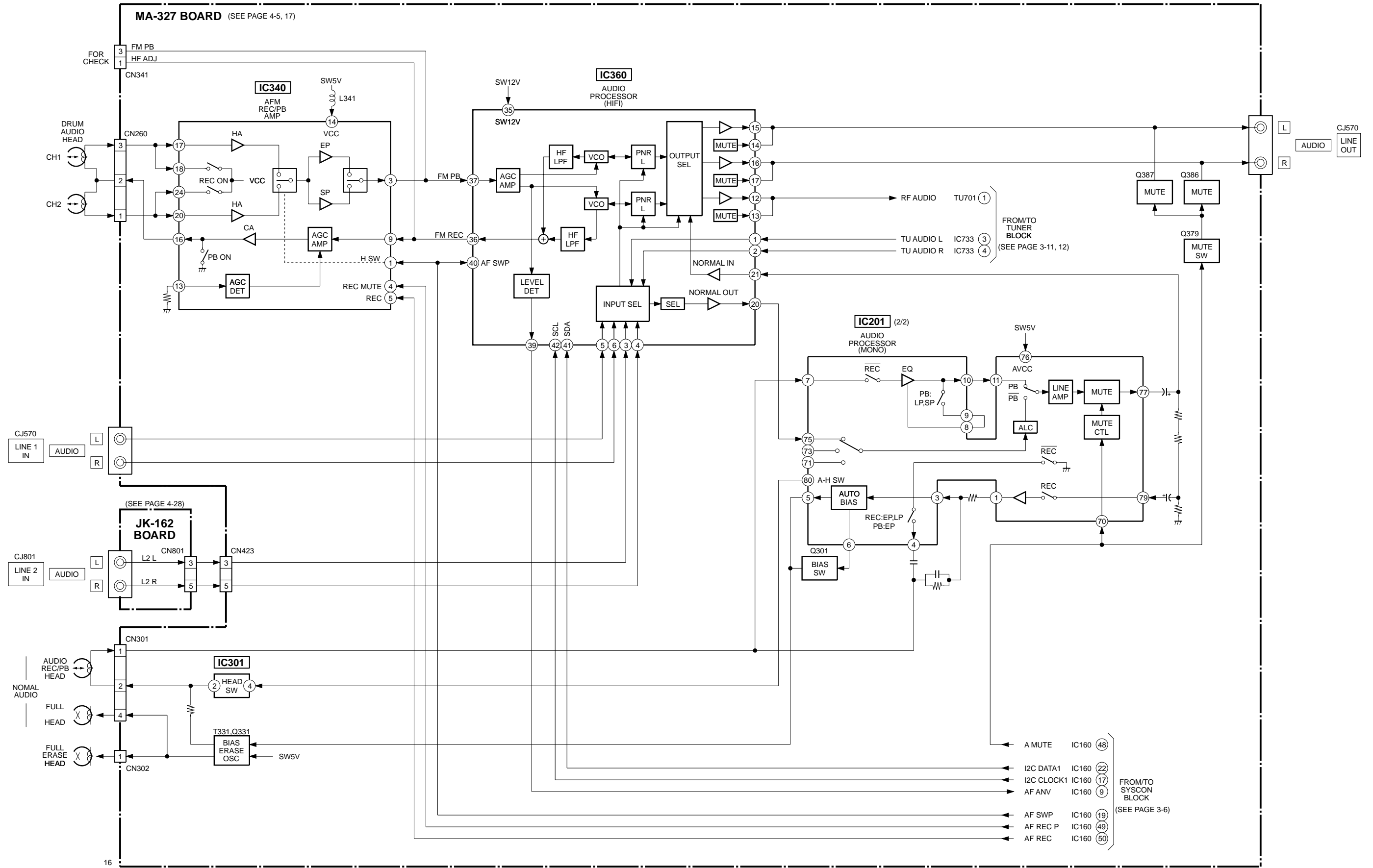




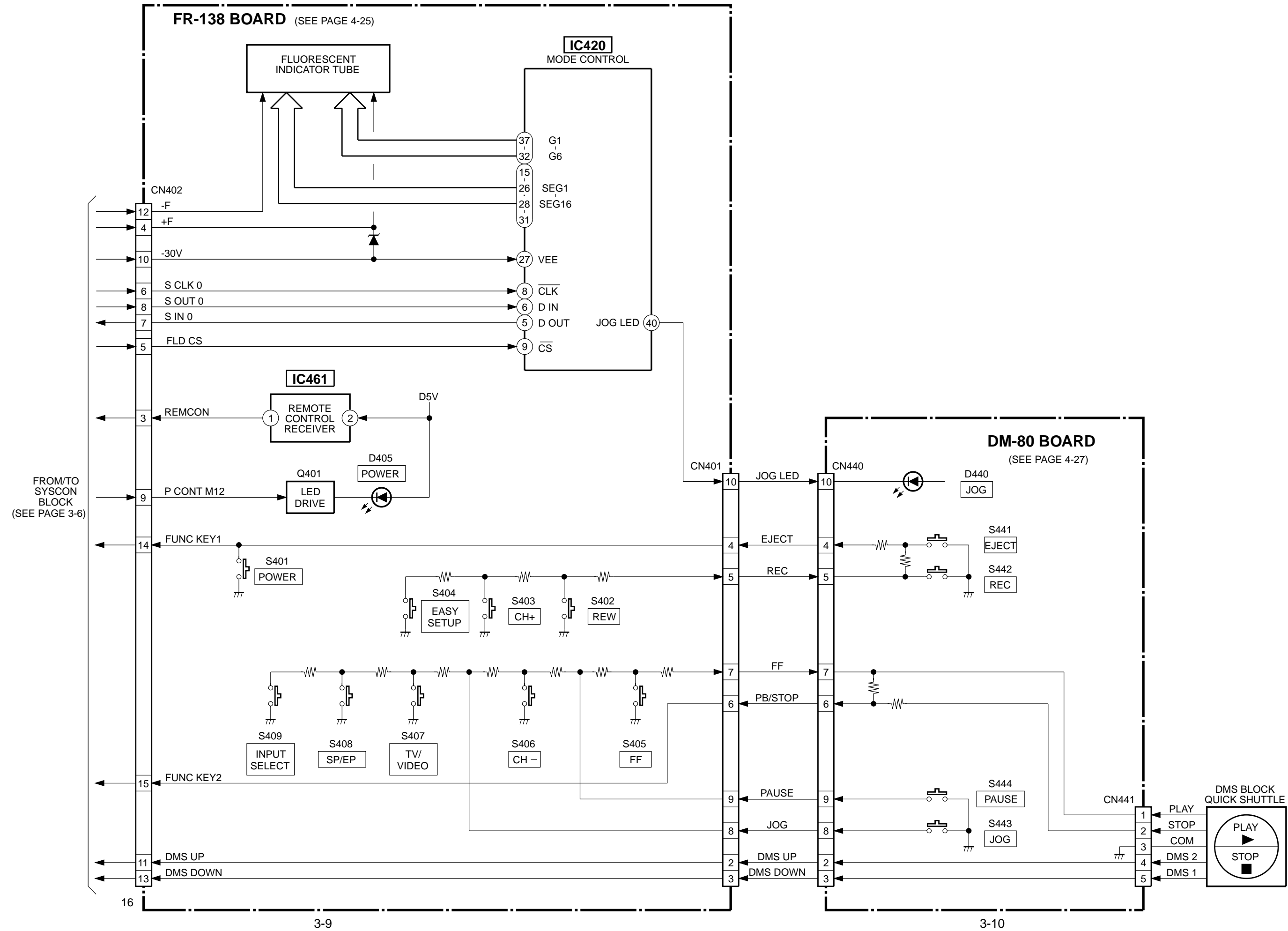
3-3. SERVO/SYSTEM CONTROL BLOCK DIAGRAM



3-4. AUDIO BLOCK DIAGRAM

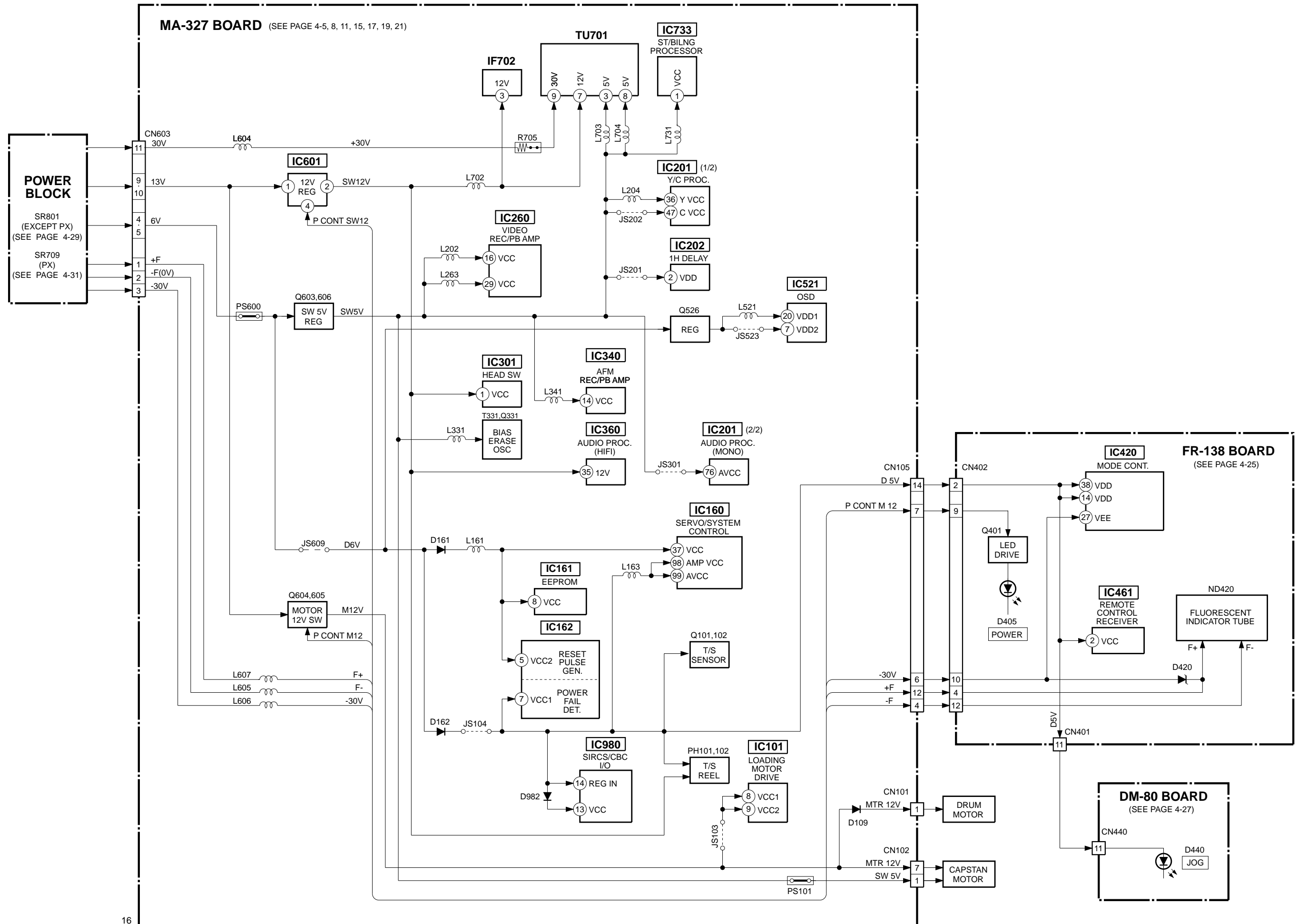


3-5. MODE CONTROL BLOCK DIAGRAM



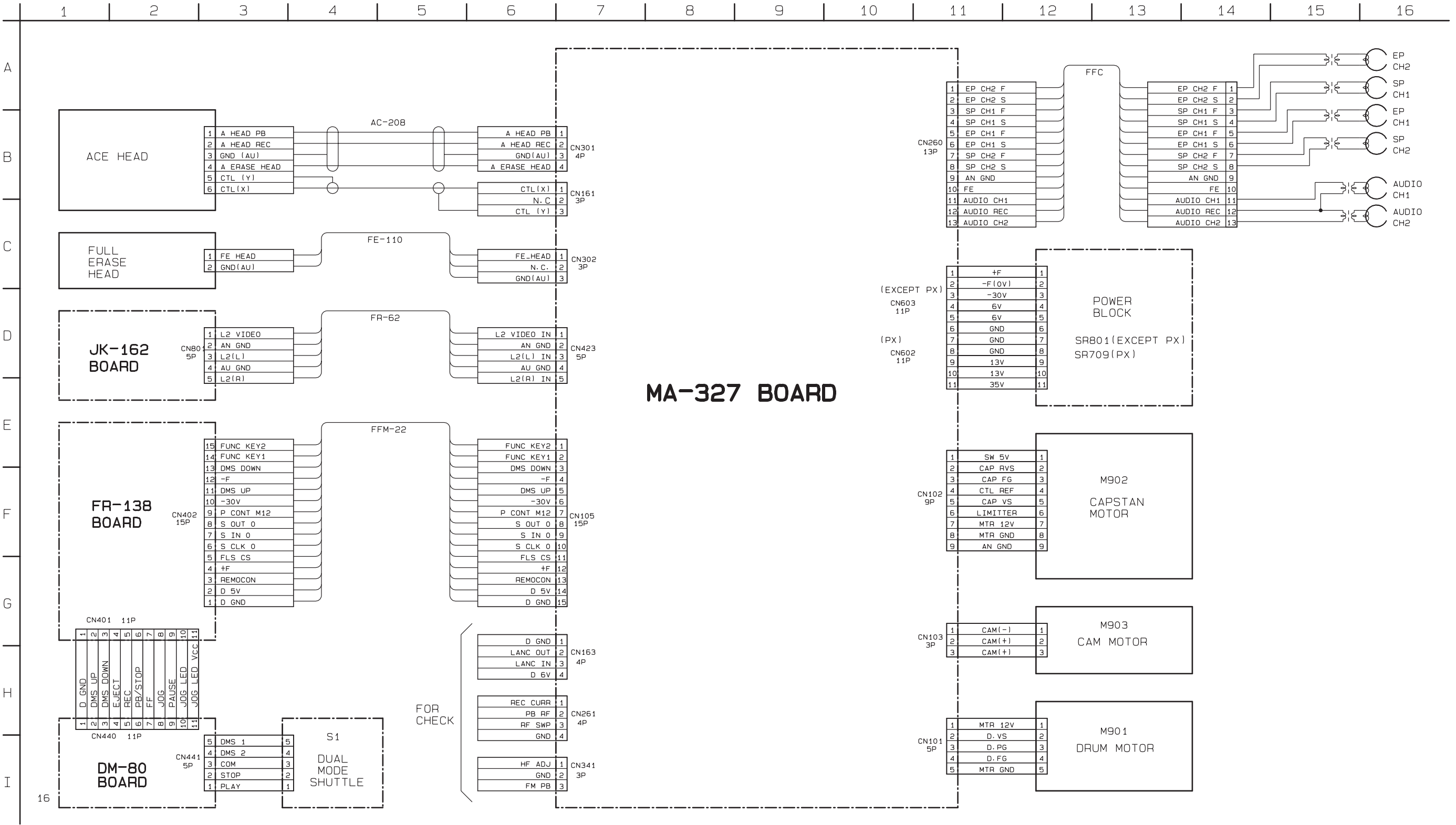
3-11





SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM



There are few cases that the part printed on this diagram isn't mounted in this model.

MA-327 (REC/PB AMP) SCHEMATIC DIAGRAM

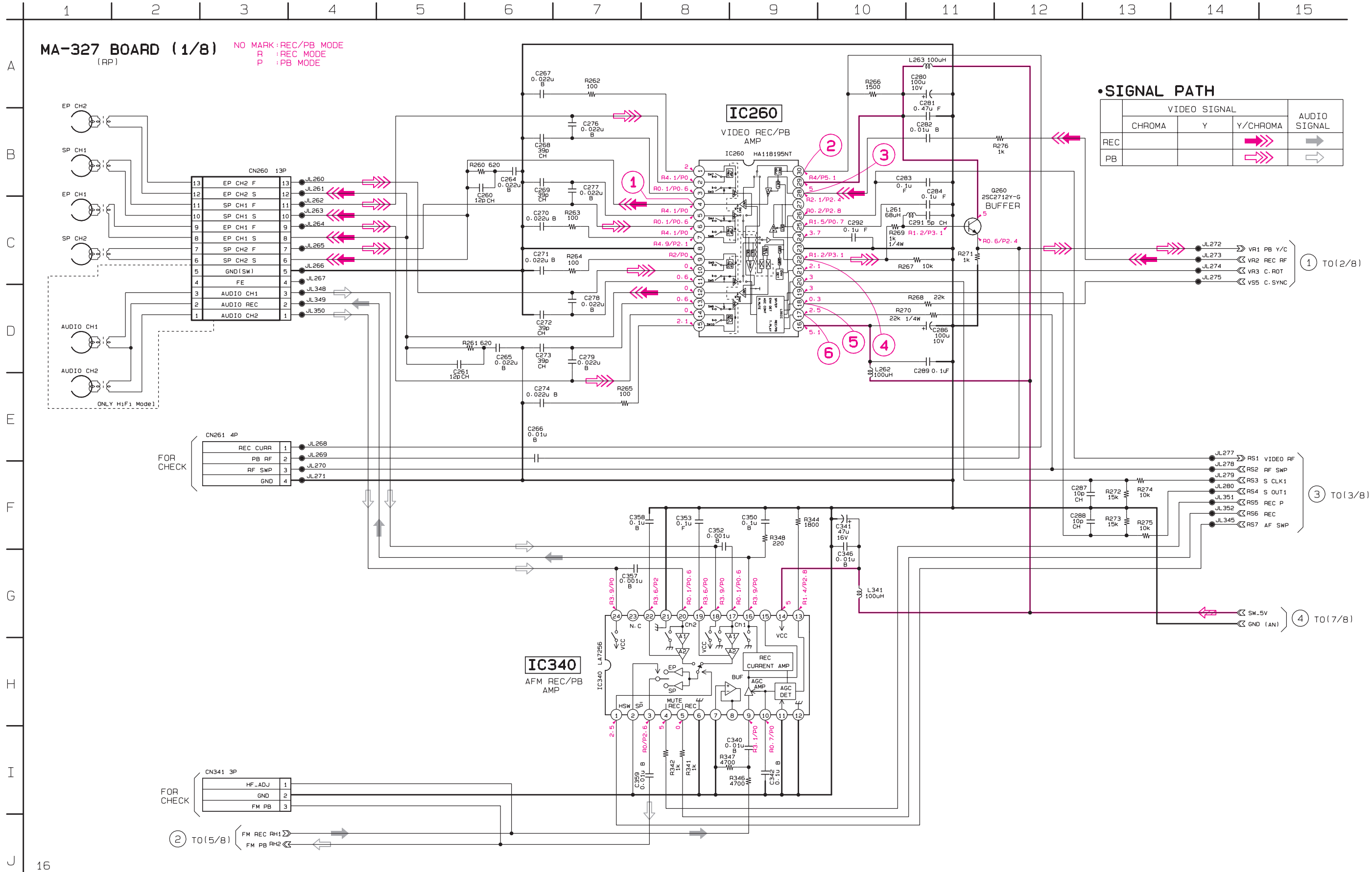
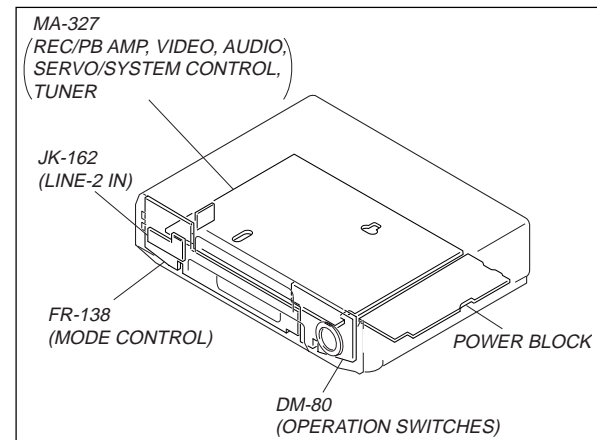
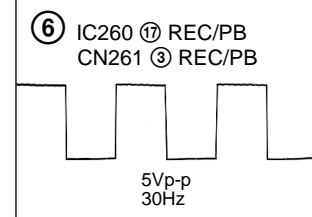
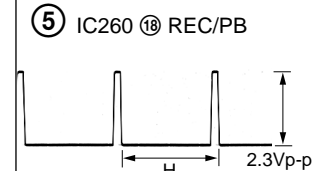
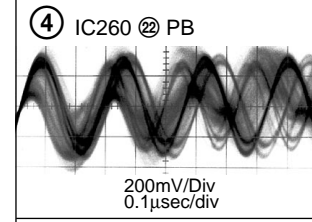
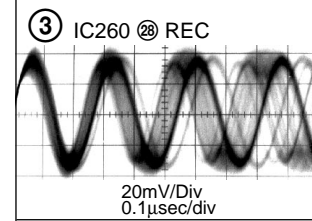
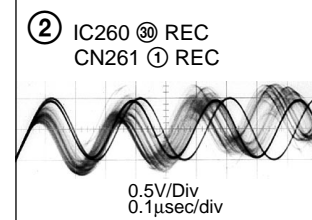
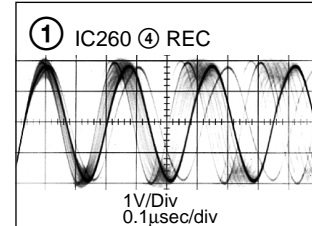
— Ref. No.: MA-327 Board; 1,000 Series —

MA-327 BOARD

CJ570	A-3	IC161	I-10
CN101	C-7	IC201	D-5
CN102	E-2	IC202	E-5
CN103	I-4	IC260	B-8
CN104	H-11	IC301	B-5
CN105	J-12	IC340	B-10
CN161	H-11	IC360	B-11
CN260	B-9	IC521	D-1
CN261	B-7	IC601	E-12
CN301	B-4	IC733	H-13
CN302	B-5	IC980	B-1
CN341	C-10		
CN423	C-12	PH101	H-8
CN602	F-1	PH102	H-4
CN603	H-1		

CNJ980	A-2	Q101	F-1
CNJ981	A-2	Q102	F-10
		Q103	F-5

D103	F-6	Q201	C-3
D109	H-3	Q202	C-3
D161	I-8	Q208	D-4
D162	I-8	Q209	E-4
D370	C-10	Q210	E-5
D379	B-13	Q211	D-6
D521	D-1	Q212	D-2
D560	B-3	Q260	B-7
D561	A-10	Q301	C-5
D611	J-1	Q331	C-6
D612	J-1	Q379	A-13
D614	J-1	Q386	A-12
D702	F-12	Q387	A-12
D980	A-2	Q523	C-2
D981	A-2	Q524	C-2
D982	B-1	Q525	C-1
D983	A-1	Q526	D-1
D984	A-1	Q560	B-2
		Q603	J-3
		Q604	J-6
IC101	I-3	Q605	I-3
IC160	H-9	Q606	J-2

MA-327 BOARD

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

- For printed wiring boards.
- : Pattern from the side which enables seeing.

Caution :

Pattern face side: Parts on the pattern face side seen from the pattern face are indicated.
Component Side: parts on the parts face side seen from the parts face are indicated.

- For schematic diagrams.
- Caution when replacing chip parts.
New parts must be attached after removal of chip.
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistor are in ohms, 1/4W unless otherwise noted.
Chip resistor are 1/10W unless otherwise noted.
kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF: μF. 50V or less are not indicated except for electrolytics and tantalums.
- : panel designation.
- Δ : internal component.
- — : B+ Line. *
- - - - : B- Line. *
- : IN/OUT direction of (+,-) B LINE. *
- Circled numbers refer to waveforms. *
- Voltage are dc between ground and measurement points.*
- Readings are taken with a digital multimeter (DC10MΩ).*
- Voltage variations may be noted due to normal production tolerances.*

When indicating parts by reference number, please include the board name.

- * : indicated by the color red.

— Ref. No.: MA-327 Board; 1,000 Series —





<p>⑦ IC201 ⑮ PB CN261 ② PB</p> <p>200mV/Div 0.1μsec/div</p>	<p>⑬ IC201 ③ REC/ PB</p> <p>H 2Vp-p</p>
<p>⑧ IC201 ⑰ PB</p> <p>200mV/Div 0.1μsec/div</p>	<p>⑭ IC201 ⑤ PB</p> <p>H 500mVp-p</p>
<p>⑨ IC201 ⑳ REC</p> <p>H 0.5Vp-p</p>	<p>⑮ IC201 ⑥ REC</p> <p>3.579545MHz 550mVp-p</p>
<p>⑩ IC201 ㉑ REC</p> <p>H 1Vp-p</p>	<p>⑯ IC201 ⑥ PB</p> <p>3.579545MHz 500mVp-p</p>
<p>⑪ IC201 ㉓ REC</p> <p>H 1Vp-p</p>	<p>⑰ IC201 ④ REC IC201 ⑤ REC</p> <p>H 340mVp-p</p>
<p>⑫ IC201 ㉔ REC/PB</p> <p>H 4Vp-p</p>	<p>⑰ IC201 ④ PB IC201 ⑤ PB</p> <p>H 0.23Vp-p</p>

4-8



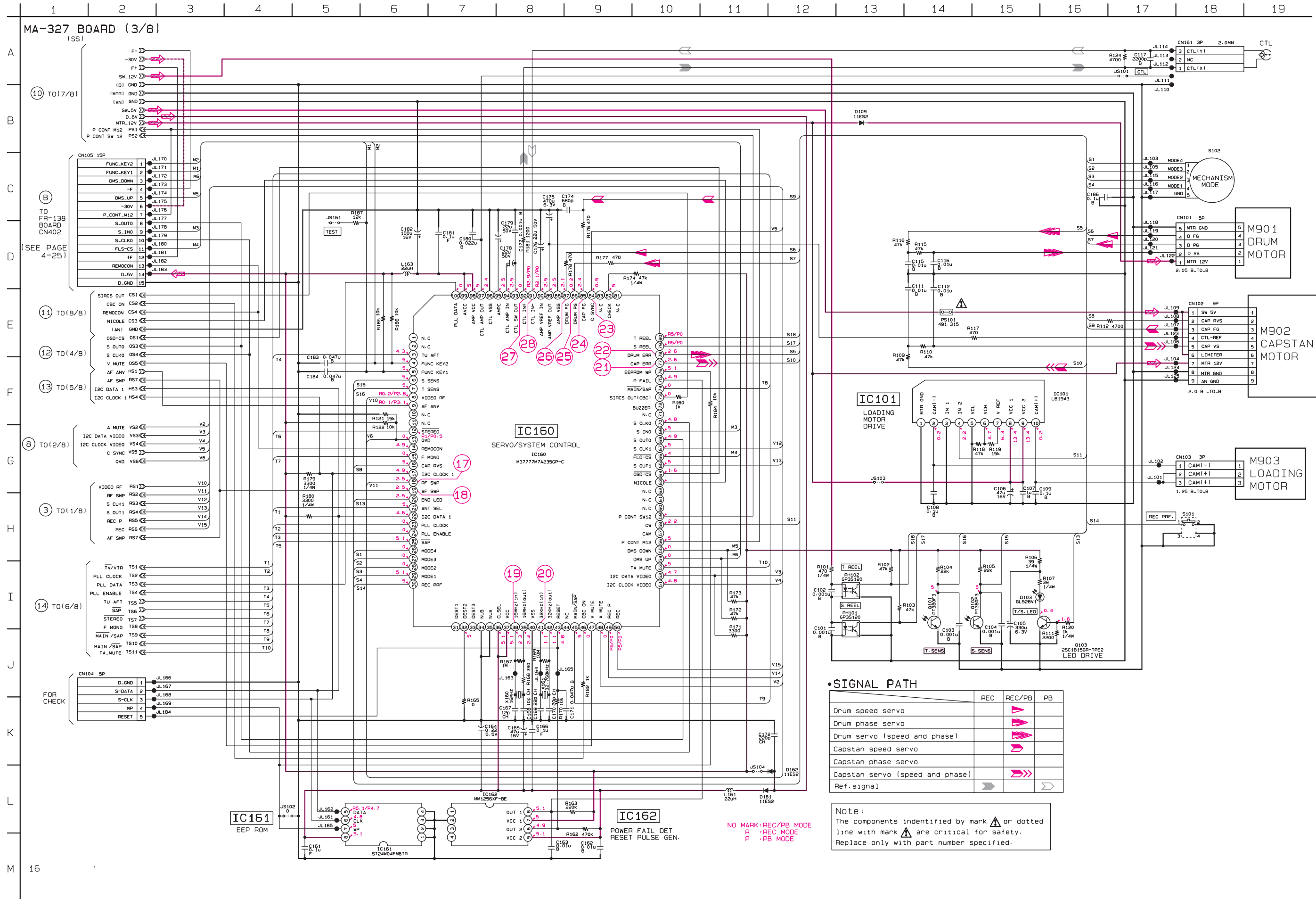
4-10

• SIGNAL PATH

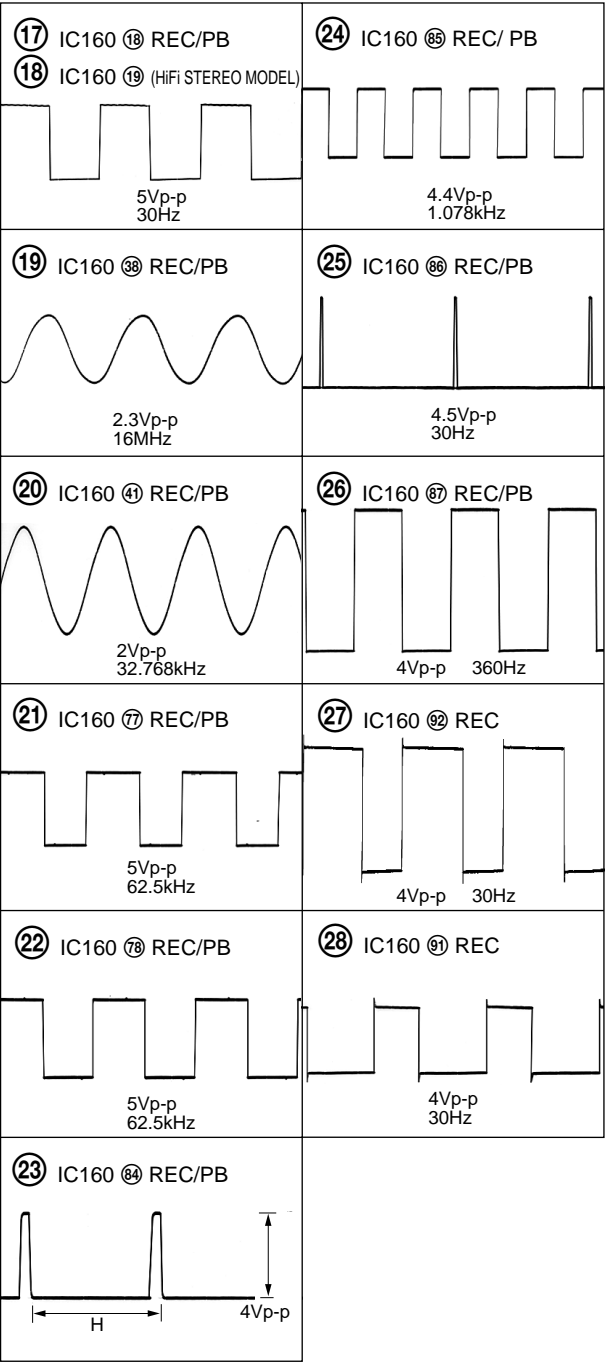
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC				
PB				

NO MARK: REC/PB MODE
R : REC MODE
P : PB MODE

MA-327 (SERVO/SYSTEM CONTROL) SCHEMATIC DIAGRAM • See page 4-3 for MA-327 BOARD printed wiring board.
— Ref. No.: MA-327 Board; 1,000 Series —



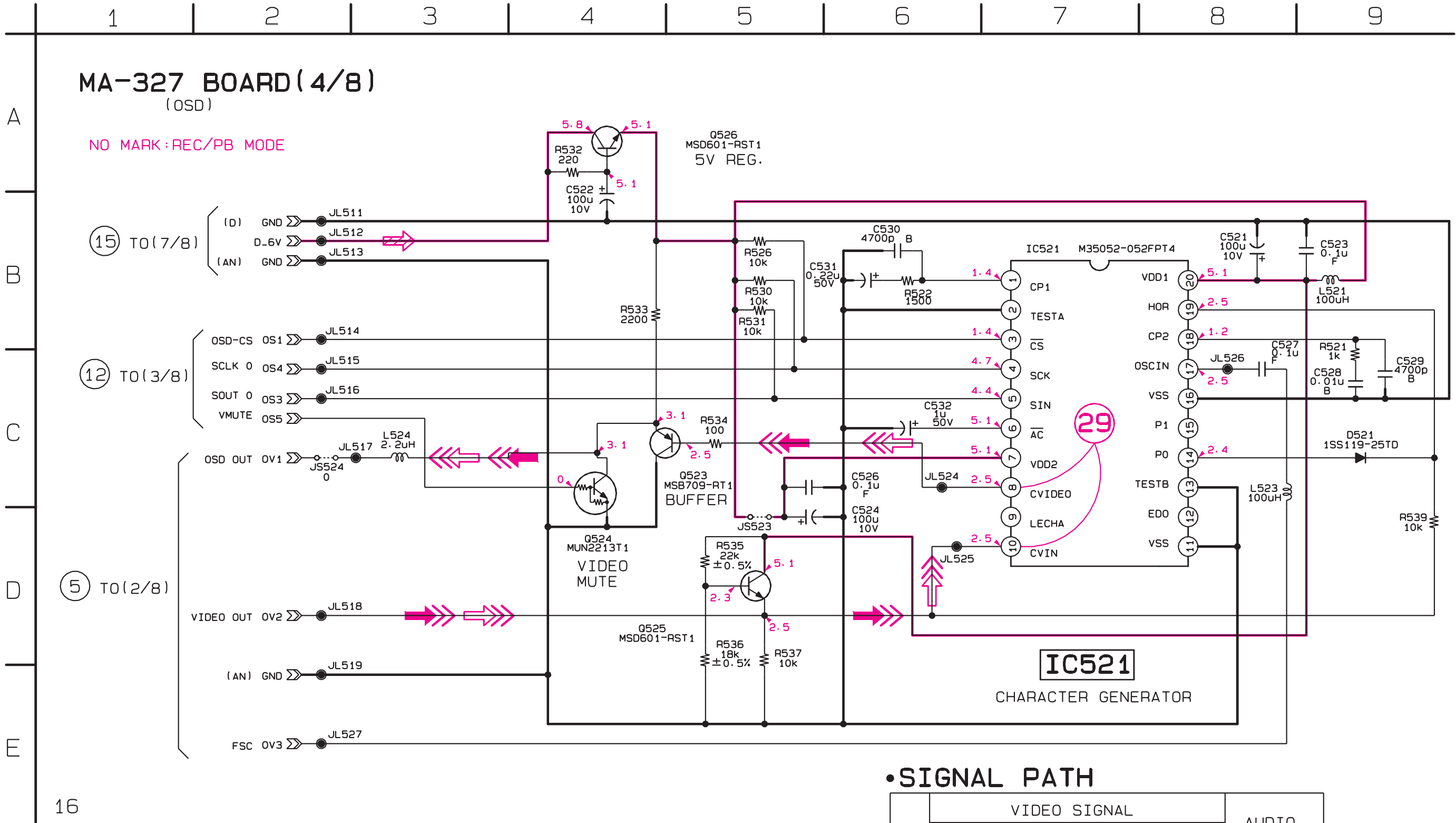
MA-327 BOARD



• SIGNAL PATH

	REC	REC/PB	PB
Drum speed servo			
Drum phase servo			
Drum servo (speed and phase)			
Capstan speed servo			
Capstan phase servo			
Capstan servo (speed and phase)			
Ref. signal			

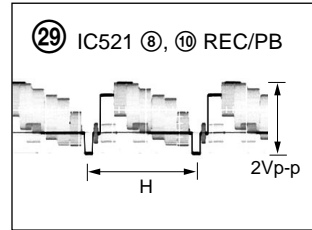
Note:
The components identified by mark or dotted line with mark are critical for safety.
Replace only with part number specified.



•SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC			➡➡➡	
PB			➡➡➡	

MA-327 BOARD

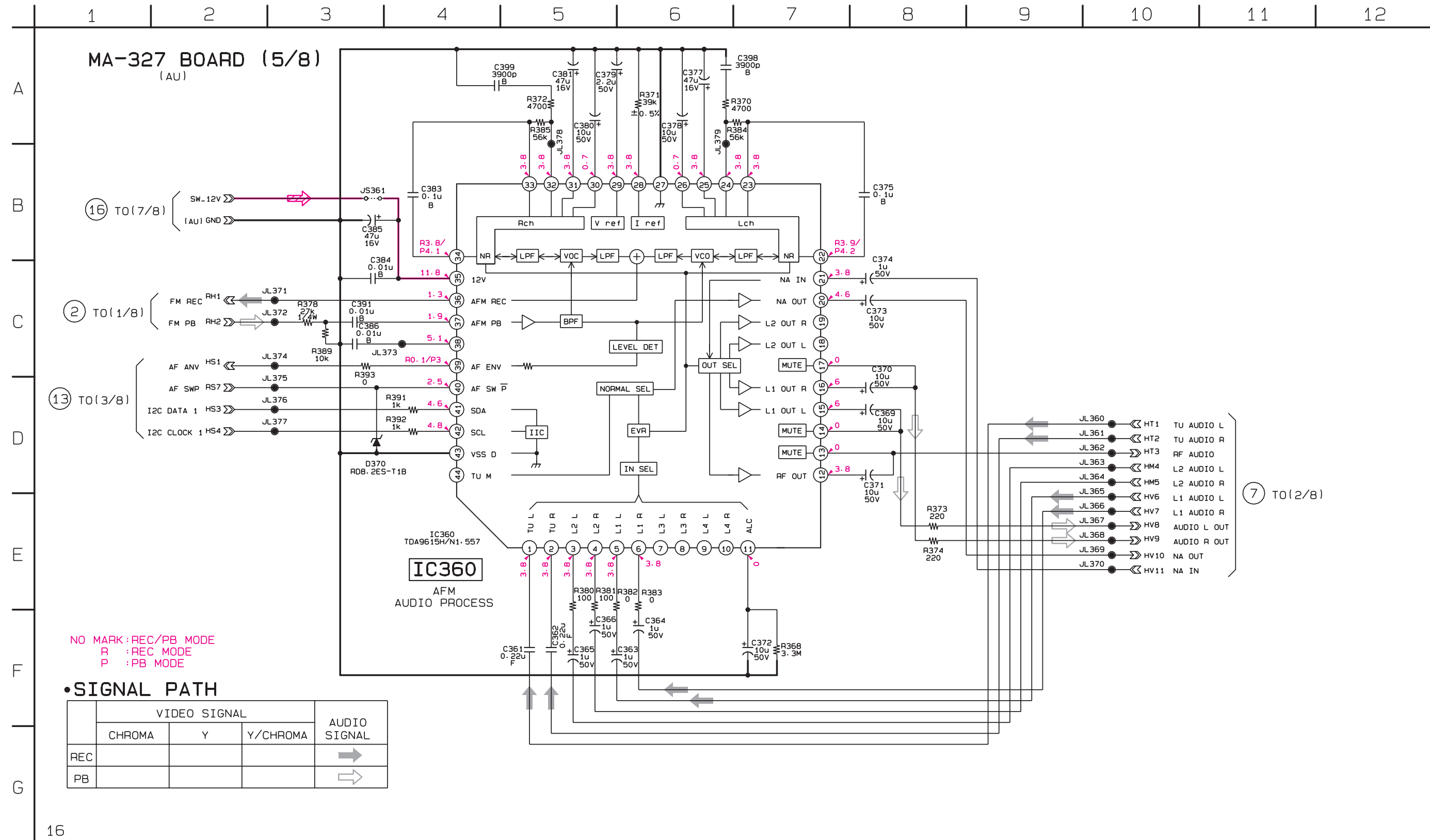


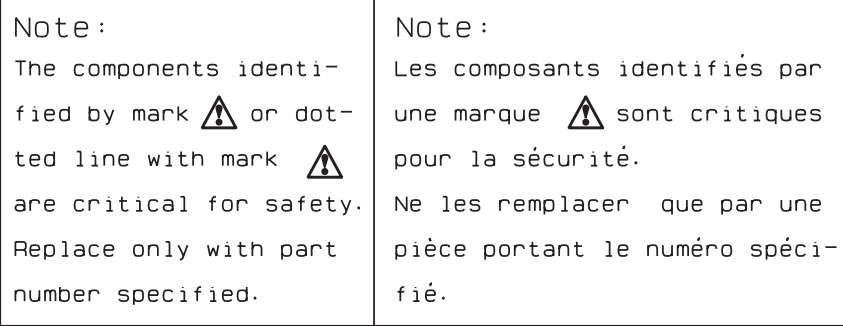
ON SCREEN DISPLAY
MA-327 (4/8)

MA-327 (AFM AUDIO) SCHEMATIC DIAGRAM

— Ref. No.: MA-327 Board; 1,000 Series —

- See page 4-3 for MA-327 BOARD printed wiring board.

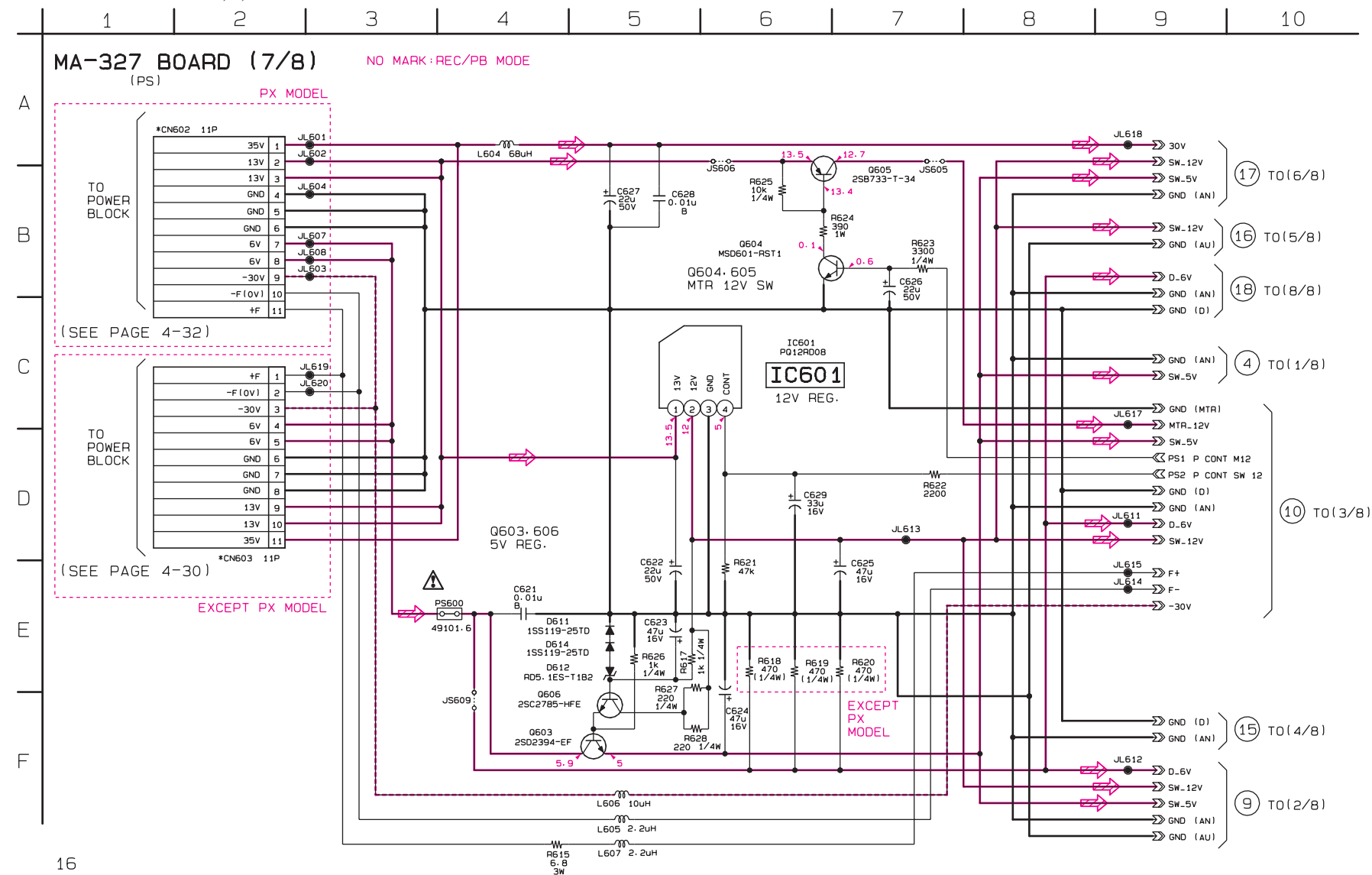






MA-316 (POWER SUPPLY, AV-BUS) SCHEMATIC DIAGRAM

- See page 4-3 for MA-327 BOARD printed wiring board.


— Ref. No.: MA-327 Board; 1,000 Series —



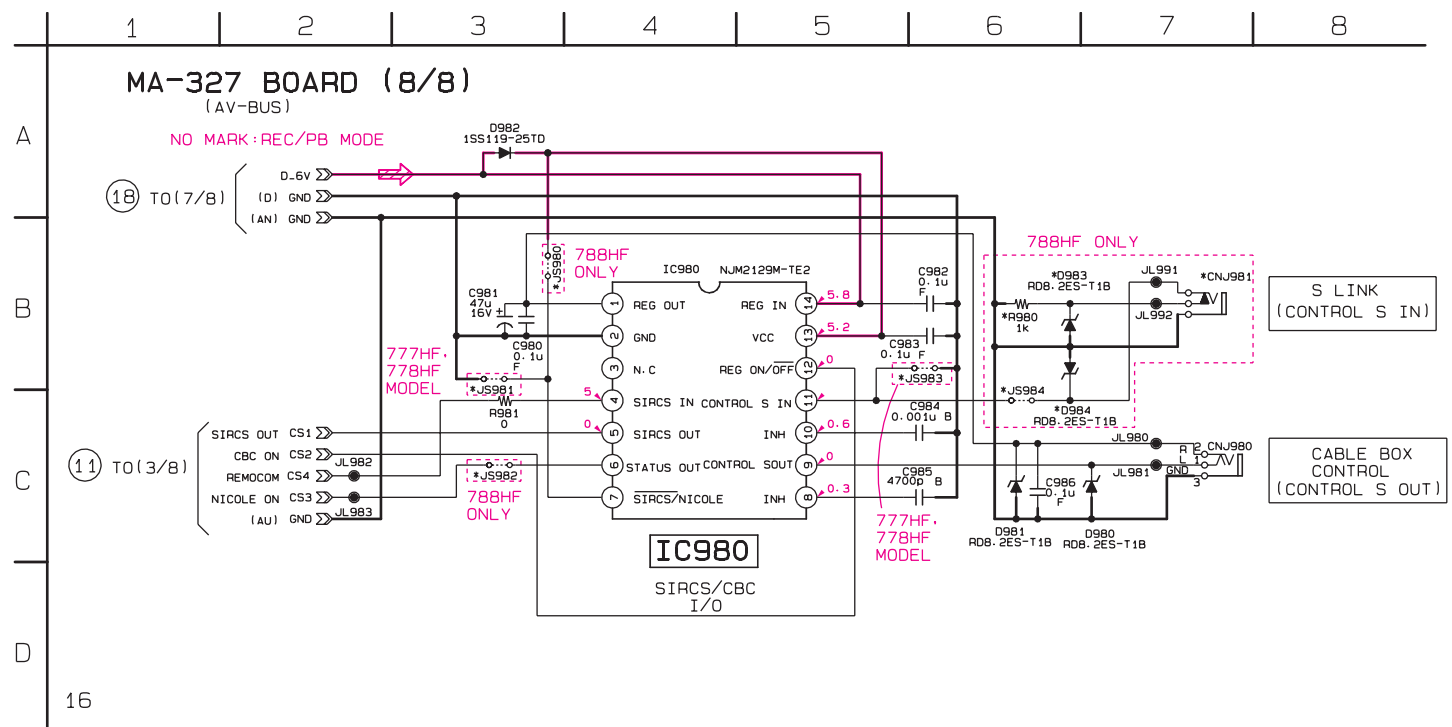
Note:

The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

Note :

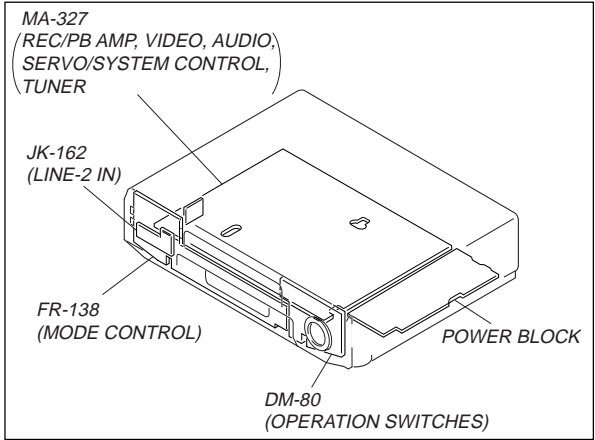
Les composants identifiés par une marque  sont critiques pour la sécurité.

Ne les remplacer que par une pièce portant le numéro spécifié.



FR-138 (MODE CONTROL) PRINTED WIRING BOARD
— Ref. No.: FR-138 Board; 2,000 Series —

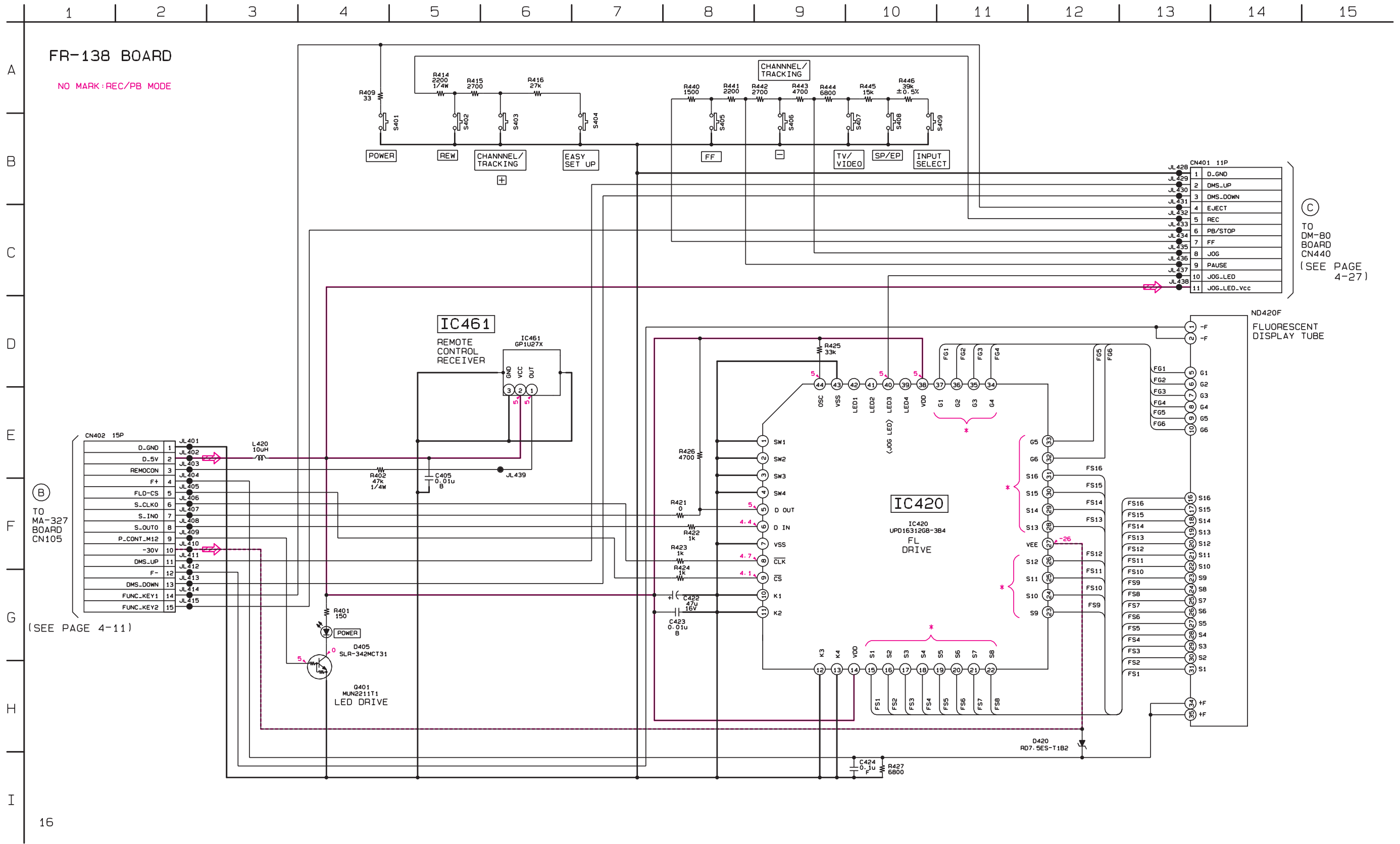
There are few cases that the part printed on this diagram isn't mounted in this model.



FR-138 BOARD

CN401	C-1
CN402	A-12
D405	A-13
D420	B-10
IC420	B-5
IC461	A-13
Q401	A-13

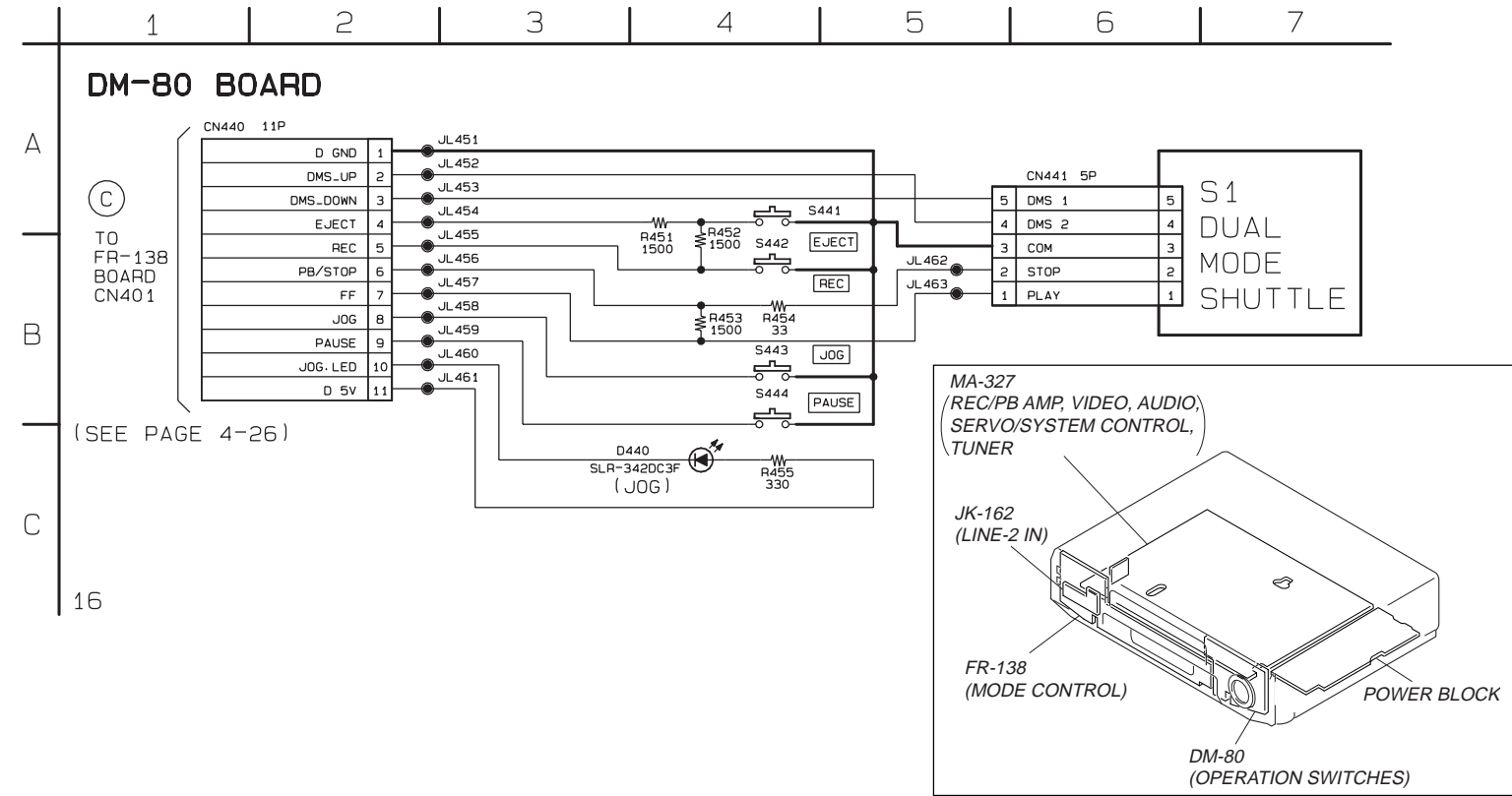
FR-138 (MODE CONTROL) SCHEMATIC DIAGRAM
— Ref. No.: FR-138 Board; 2,000 Series —



DM-80 (OPERATION SWITCHES) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

— Ref. No.: DM-80 Board; 2,000 Series —

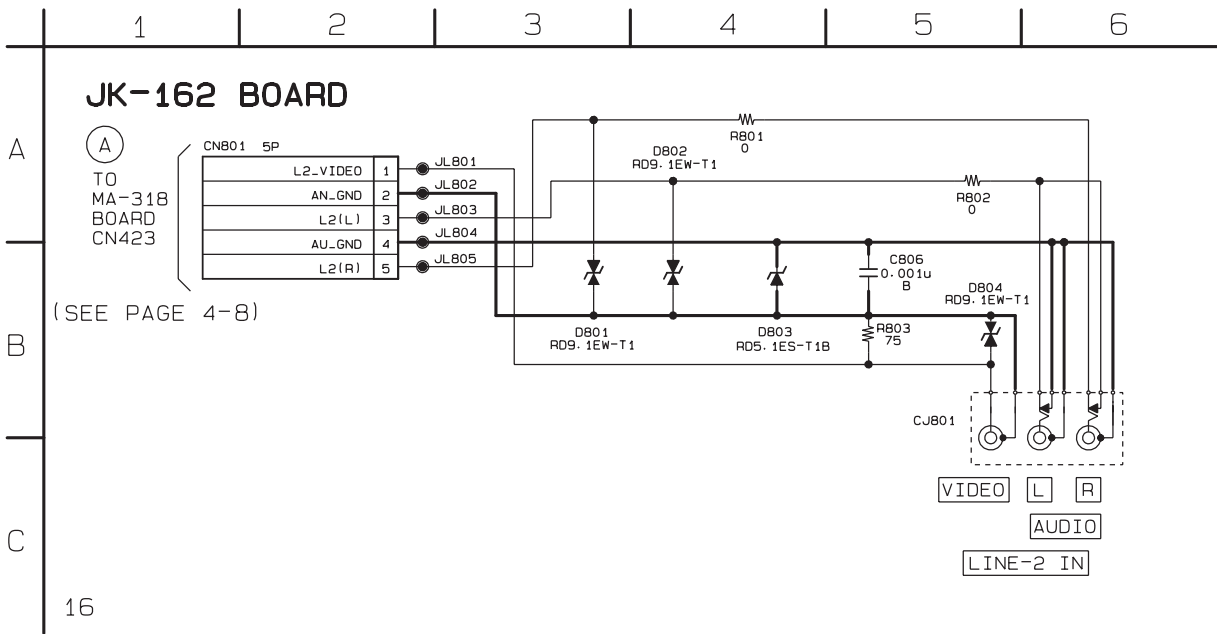
There are few cases that the part printed on this diagram isn't mounted in this model.



JK-162 (LINE-2 IN) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

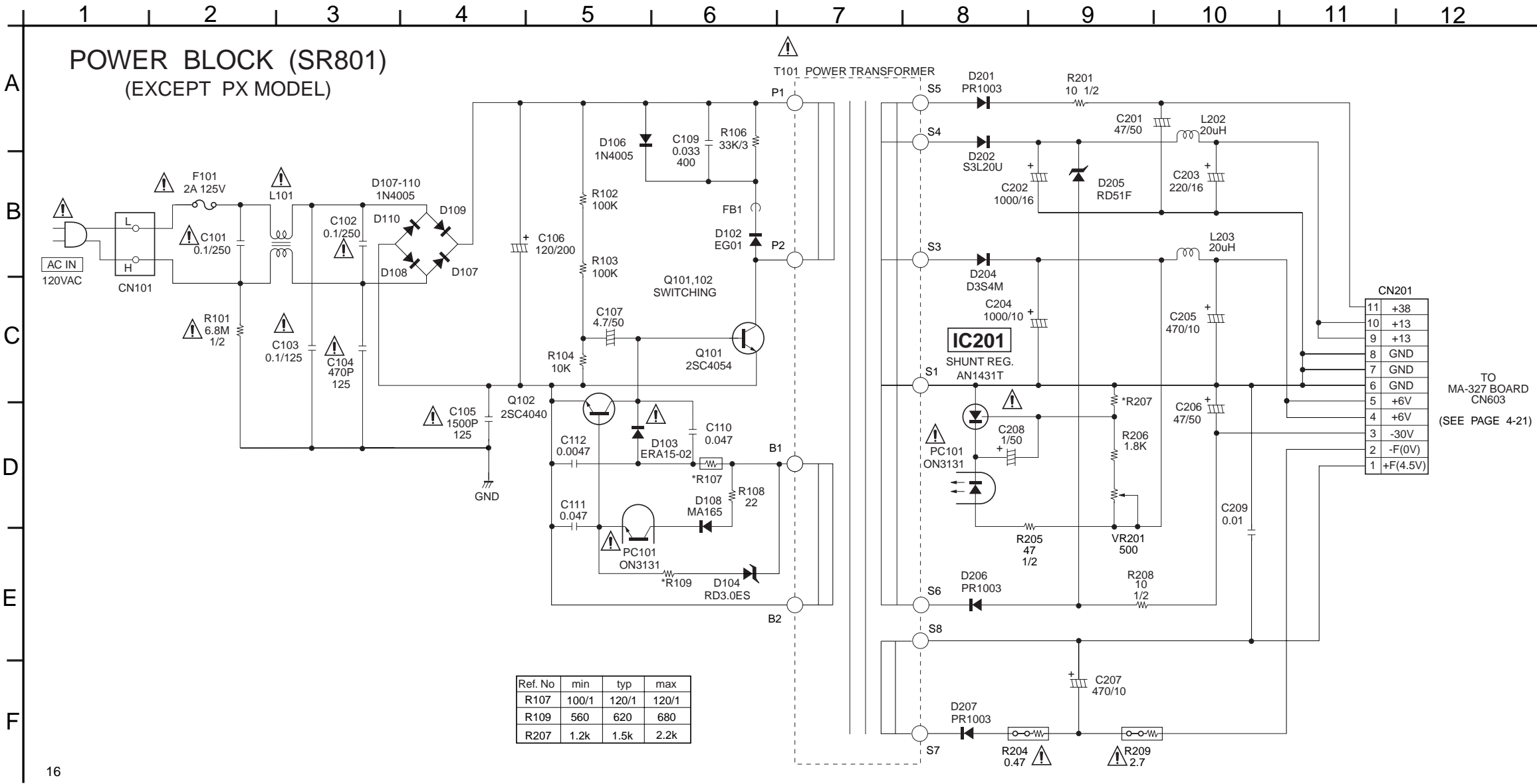
— Ref. No.: JK-162 Board; 2,000 Series —

There are few cases that the part printed on this diagram isn't mounted in this model.



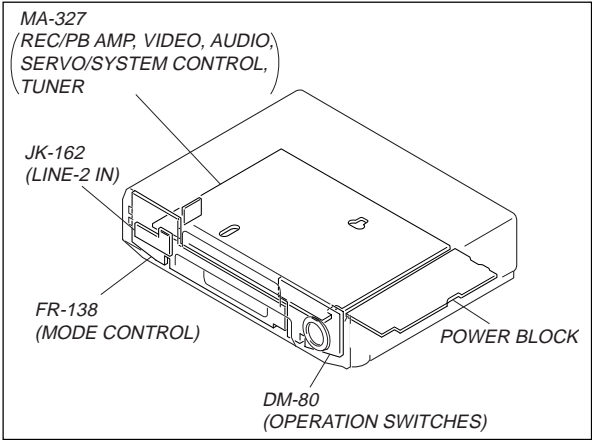
POWER BLOCK SR801 (SWITCHING REGULATOR) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM
— Ref. No.: SR801 Board; 8,000 Series —

There are few cases that the part printed on this diagram isn't mounted in this model.



Note :
The components identified by mark \triangle or dotted line with mark \triangle are critical for safety.
Replace only with part number specified.

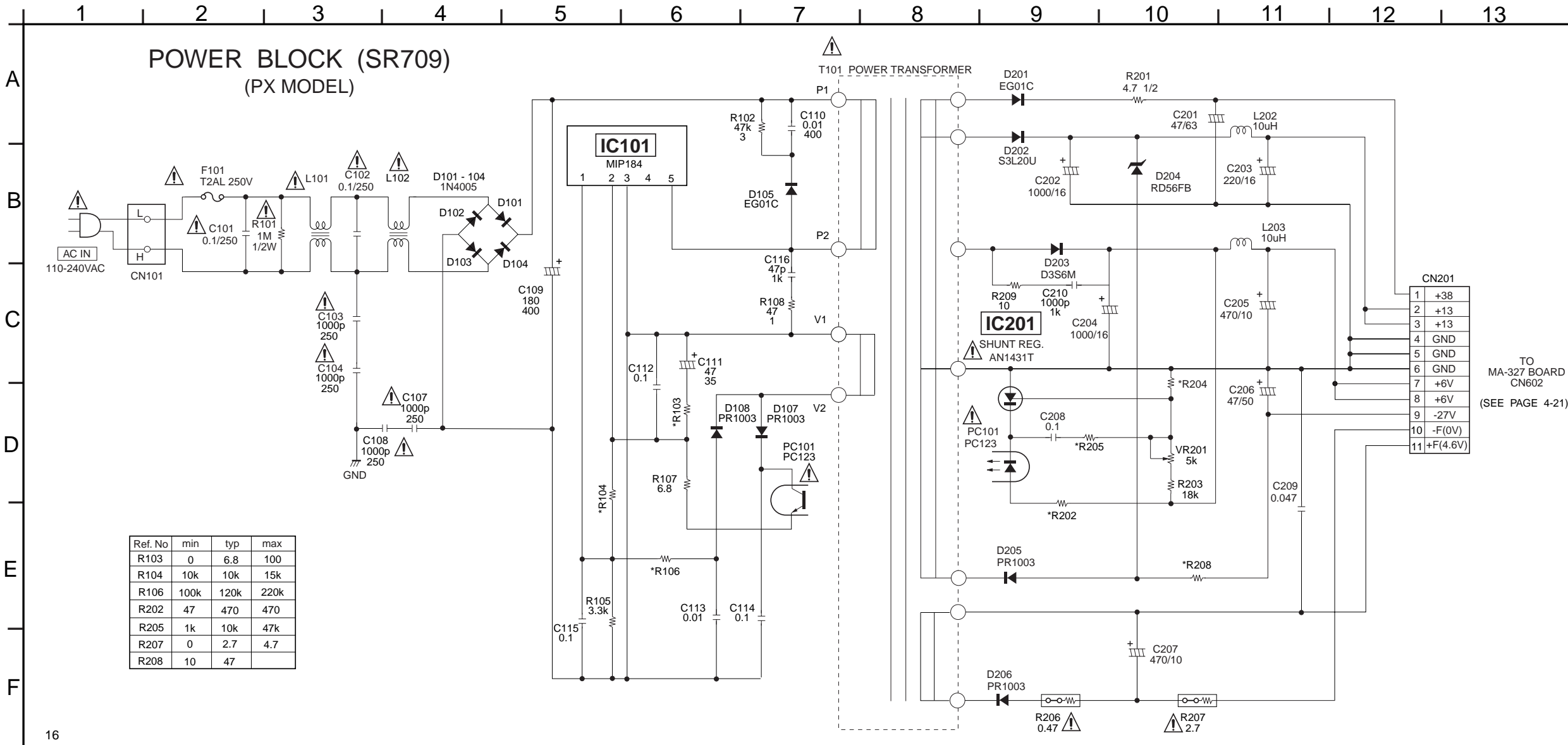
Note :
Les composants identifiés par une marque \triangle sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.



POWER BLOCK SR709 (SWITCHING REGULATOR) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

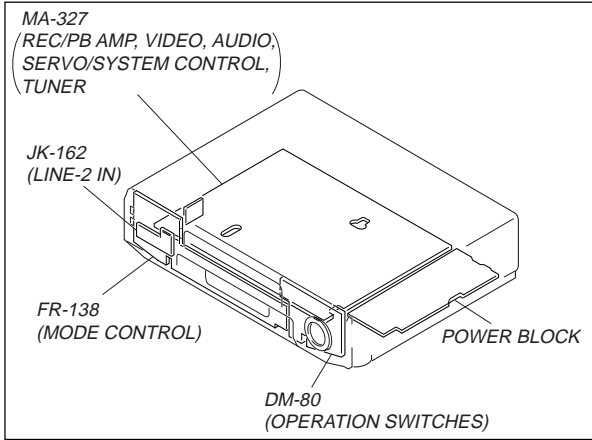
— Ref. No.: SR709 Board; 9,000 Series —

There are few cases that the part printed on this diagram isn't mounted in this model.



Note :
The components identified by mark \triangle or dotted line with mark \triangle are critical for safety.
Replace only with part number specified.

Note :
Les composants identifiés par une marque \triangle sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.



SECTION 5

INTERFACE, IC PIN FUNCTION DESCRIPTION

5-1. SYSTEM CONTROL — MECHANISM BLOCK INTERFACE (MA-327 board IC160)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOADING	TAPE THREADING	TAPE UNTHREADING	STOP	FF	REW	PB	REC
CW	MA-327 Board IC160 ⑥⑧	O	*5	H	L	H	L	*5	*5	*5	*5	*5
MODE 1	MA-327 Board IC160 ②⑨	I	—	—	—	—	—	H	H	H	H	H
MODE 2	MA-327 Board IC160 ②⑧	I	—	—	—	—	—	L	L	L	H	H
MODE 3	MA-327 Board IC160 ②⑦	I	—	—	—	—	—	H	H	H	L	L
MODE 4	MA-327 Board IC160 ②⑥	I	—	—	—	—	—	H	L	L	L	L
REC PRF	MA-327 Board IC160 ③⑩	I	L	*1	*1	*1	*1	*1	*1	*1	*1	*1
T REEL	MA-327 Board IC160 ③⑨	I	H/L	H/L	H/L	H/L	H/L	H/L	*2	*2	*2	*2
S REEL	MA-327 Board IC160 ③⑧	I	H/L	H/L	H/L	*2	*2	H/L	*2	*2	*2	*2
END LED	MA-327 Board IC160 ②⑩	O	L	*3	*3	*3	*3	*3	*3	*3	*3	*3
T SENS	MA-327 Board IC160 ⑦	I	*3	*3	*3	*4	*4	*4	*4	*4	*4	*4
S SENS	MA-327 Board IC160 ⑥	I	*3	*3	*3	*4	*4	*4	*4	*4	*4	*4

- *1. “L” When erasing protection tab is bent. “H” when not bent.
- *2. Pulse of period in proportion to reel rotating speed.
- *3. Approx. 2 msec period “H” pulse when tape top or end is detected.
- *4. Normally “L”. 2 msec period “H” pulse when tape top or end is detected.
- *5. Hi-Z

5-2. SYSTEM CONTROL — SERVO PERIPHERAL CIRCUIT INTERFACE (MA-327 board IC160)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREADING	TAPE UNTHREADING	PB	REC
CTL IN+	MA-327 Board IC160 ②②	O	*7	*7	*7	*7	*7	*7	*1
DRUM PG	MA-327 Board IC160 ③⑨	I	*3	*3	*3	*3	*3	*3	*3
DRUM FG	MA-327 Board IC160 ③⑦	I	*4	*4	*4	*4	*4	*4	*4
CAP FG	MA-327 Board IC160 ③⑤	I	H/L	*2	*2	*5	*5	*2	*2
CAP RVS	MA-327 Board IC160 ③⑥	O	H/L	L	H	L	H	L	L
CAP ERR	MA-327 Board IC160 ⑦⑦	O	L	*6	*6	*6	*6	*6	*6
DRUM ERR	MA-327 Board IC160 ⑦⑧	O	*6	*6	*6	*6	*6	*6	*6

- *1. 30 Hz pulse
- *2. Pulse of period in proportion to tape speed.
- *3. 30 Hz “H” pulse.
- *4. 720 Hz pulse.
- *5. Unstable period pulse.
- *6. DC voltage 1 ~ 5V.
- *7. Hi-Z (2.5V).

5-3. SYSTEM CONTROL — SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-327 board IC160)

Signal	Pin No.	I/O	I/O level
RESET	MA-327 Board IC160 ④	I	Normally “H”. “L” when service interruption detected or restored.
I2C DATA1	MA-327 Board IC160 ②	I/O	Serial communication data to audio microprocessor and EEPROM I2C161.
I2C CLOCK1	MA-327 Board IC160 ⑦	O	Serial communication clock to audio microprocessor and EEPROM I2C161.
I2C DATA VIDEO	MA-327 Board IC160 ⑤	I/O	Serial communication data to video microprocessor.
I2C CLOCK VIDEO	MA-327 Board IC160 ⑤	O	Serial communication clock to video microprocessor.
(RP) S OUT1	MA-327 Board IC160 ⑥	I/O	Serial communication data to RP microprocessor.
(RP) S CLK1	MA-327 Board IC160 ⑦	O	Serial communication clock to RP microprocessor.

5-4. SYSTEM CONTROL AND RF MODULATOR — INPUT SELECTION BLOCK INTERFACE (MA-327 board IC160)

Signal	Pin No.	I/O	I/O level
ANT SEL	MA-327 Board IC160 ②	O	“L” when RF modulator through.

5-5. SYSTEM CONTROL — VIDEO/RP BLOCK INTERFACE (MA-327 board IC160)

Signal	Pin No.	I/O	STOP/FF /REW	TAPE LOADING	TAPE UNLOADING	PB	REC	REC PAUSE
RF SWP	MA-327 Board IC160 ⑩	O	*1	*1	*1	*1	*1	*1
QVD	MA-327 Board IC160 ⑬	O	L	L	L	*2	L	L
REC P	MA-327 Board IC160 ④	O	L	L	L	L	L	H
C SYNC	MA-327 Board IC160 ④	I	*3	*3	*3	*3	*3	*3

*1. Synchronized with drum rotation. 30Hz 50% duty pulse.

*2. Normal “L”. “H” when video signal is not regenerated.

*3. Composite sync signal (positive).

5-6. SYSTEM CONTROL — AUDIO BLOCK INTERFACE (MA-327 board IC160)

Signal	Pin No.	I/O	STOP/FF /REW	TAPE LOADING	TAPE UNLOADING	PB	REC	REC PAUSE
A MUTE	MA-327 Board IC160 ④	O	L	L	L	L	L	H

5-7. SERVO/SYSTEM CONTROL MICROPROCESSOR (MA-327 BOARD IC160)

Pin.No.	Signal	I/O	Function
1	—	—	—
2	—	—	—
3	TU AFT	I	Tuner analog AFT input
4	FUNC KEY 2	I	key input
5	FUNC KEY 1	I	key input
6	SSENS	I	Tape end sensor
7	TSENS	I	Tape top sensor
8	VIDEO RF	I	Video RF input
9	AF ENV	I	HiFi envelope
10	—	—	—
11	—	—	—
12	STEREO	I	Tuner stereo detection input L: Stereo
13	QVD	O	Quasi VD
14	REMOCON	I	Infrared ray catcher
15	F MONO	O	Forced mono
16	CAP RVS	O	Capstan reverse
17	I2C CLOCK 1	O	I2C clock (EEPROM, HiFi, PLL MOD)
18	RF SWP	O	RF switching pulse
19	AF SWP	O	HiFi switching pulse
20	END LED	O	End sensor LED output
21	ANT SEL	O	TV/VTR RF modulator
22	I2C DATA 1	I/O	I2C data (EEPROM, HiFi, PLL MOD)
23	PLL CLK	O	Tuner PLL clock
24	PLL ENABLE	O	Tuner enable
25	SAP	I	SAP discrimination
26	MODE 4	I	Cam encoding data 4
27	MODE 3	I	Cam encoding data 3
28	MODE 2	I	Cam encoding data 2
29	MODE 1	I	Cam encoding data 1
30	RECPRF	I	Mis-record prevention switch signal input
31	DEST1	I	Destination discrimination input 1
32	DEST2	I	Destination discrimination input 2
33	DEST3	I	Destination discrimination input 3
34	NUB	I	Ground
35	NUA	I	Ground
36	CLSEL	I	5V
37	VCC	I	5V
38	16 MHz (in)	I	16MHz
39	16 MHz (out)	O	16MHz
40	VSS	I	Ground
41	32 kHz (in)	I	32kHz
42	32 kHz (out)	O	32kHz
43	RESET	I	Reset signal input
44	—	—	—
45	MAIN/SAP	O	MAIN/SAP judge signal out
46	CBC ON	O	Cable box control signal output
47	V MUTE	O	Video mute
48	AMUTE	O	Audio mute
49	REC P	O	HiFi audio record control
50	REC	O	Audio record control L: Playback

Pin.No.	Signal	I/O	Function
51	I2C CLOCK VIDEO	O	I2C clock (Video)
52	I2C DATA VIDEO	O	I2C data (Video)
53	TA MUTE	O	Tuner-audio mute
54	DMS UP	I	DMS control
55	DMS DOWN	I	DMS control
56	P CONT M12	O	Motor 12V control
57	—	—	—
58	CW	I/O	Cam motor control 2
59	P CONT SW12	O	SW 12V control
60	—	—	—
61	—	—	—
62	—	—	—
63	NICOLE	O	NICOLE control signal out (788HF)
64	OSD CS	O	OSD chip select
65	SOUT 1	O	Serial out Ch1 (RP)
66	FLD CS	O	Fluorescent display driver chip select
67	SCLK 1	O	Serial clock Ch1 (RP)
68	SOUT 0	O	Serial out Ch0 (FLD, OSD)
69	SIN 0	I	Serial in Ch0 (FLD, OSD)
70	SCLK 0	O	Serial clock Ch0 (FLD, OSD)
71	—	—	—
72	BUZZER	I/O	Buzzer
73	SIRCS OUT (CBC)	O	Remote control signal output (CBC)
74	MAIN/SAP	O	MAIN/SAP select
75	PFail	I	Power fail detection input
76	WP	O	EEPROM write protect
77	CAPERR	O	Capstan error output
78	DRUM ERR	O	Drum error output
79	SREEL	I	Supply reel sensor
80	TREEL	I	Take-up reel sensor
81	—	—	—
82	CHECK	I	Check input
83	—	—	—
84	CSYNC	I	Composite sync signal input
85	CAPFG	I	Capstan FG signal input
86	DRMPG	I	Drum FG signal input
87	DRMFG	I	Drum FG signal input
88	AMP VSS	I	CTL amp
89	AMP VREF OUT	O	CTL amp
90	AMP VREF IN	I	CTL amp
91	CTLIN-	I/O	CTL signal I/O
92	CTLIN+	I/O	CTL signal I/O
93	CTL SWOUT	O	CTL amp
94	CTL AMP IN	I	CTL amp
95	AMPC	I	CTL amp
96	CTL VSS	I	CTL amp
97	CTL AMP OUT	O	CTL amp
98	AMPVCC	I	CTL amp
99	AVCC	I	AN5V
100	PLL DATA	O	Tuner PLL data

SECTION 6 ADJUSTMENTS

6-1 MECHANICAL ADJUSTMENTS

For the mechanical adjustments, please refer to the "VHS MECHANICAL ADJUSTMENT MANUAL V (S MECHANISM)" (9-921-647-11).

6-2. ELECTRICAL ADJUSTMENTS

See the adjusting part location diagram from on page 6-8 for the adjustment.

2-1. PREPARATION BEFORE ADJUSTMENT

2-1-1. Equipment Required

The measuring instruments used for this alignment include:

- 1) Monitor TV
 - 2) Oscilloscope, dual-trace, bandwidth of 30MHz or more, with delay mode (A probe 10:1 should be used unless otherwise specified.)
 - 3) Frequency counter
 - 4) Pattern generator
 - 5) Digital voltmeter
 - 6) Audio generator
 - 7) Audio level meter
 - 8) Audio distortion meter
 - 9) Audio attenuator
 - 10) Alignment tapes
- KRV-51N2 Part No.: 8-192-605-32

2-1-2. Equipment Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

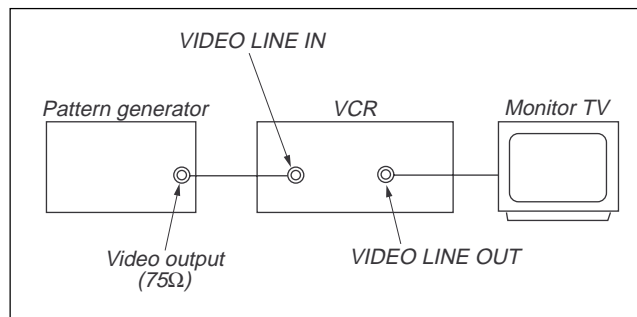


Fig. 6-2-1.

2-1-3. Input Signal Check

Video signal produced by a pattern generator is used as an adjustment signal to perform electrical alignment for this unit. This video signal must satisfy the specification.

Unless otherwise specified, place the switches and controls of this unit in the following positions:

- **INPUT SELECT** switch LINE 1

Connect an oscilloscope to the Video Input terminal. Check that the synchronizing signal of the Y signal has an amplitude of approximately 0.7V and that the burst signal has an amplitude of approximately 0.3V and its waveform is flat. And check that the level ratio of burst signal to "red" signal is 0.30 : 0.66. The video signal (color bar) used for electrical aligning this unit is shown in Fig. 6-2-2.

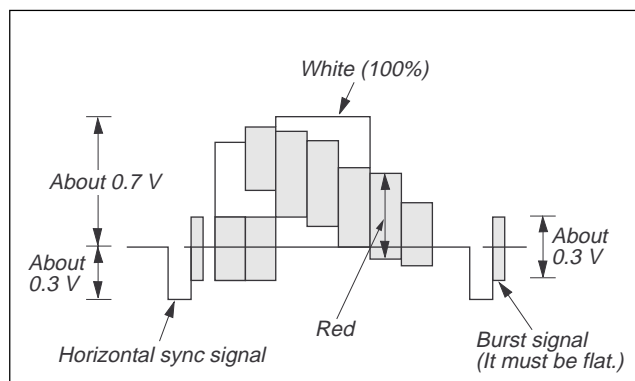


Fig. 6-2-2. Color Bar Signals of Pattern Generator

2-1-4. Alignment Tape

- Contents of KRV-51N2

	Mode	Period	Video signal	Audio signal	
				Hi-Fi	Normal
1	SP	7 minutes	Color bar	400Hz	400Hz
2		3 minutes	Monoscope		
3	EP	7 minutes	Color bar		
4		3 minutes	Monoscope		

2-1-5. Input/Output Levels and Impedance

Video input: LINE IN
Input signal: 1Vp-p, 75ohms, unbalanced, sync negative

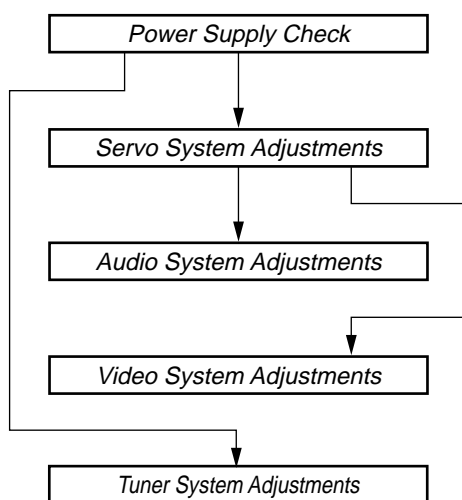
Video output: LINE OUT
Output signal: 1Vp-p, 75ohms, unbalanced, sync negative

Audio input: LINE IN
Input level: -7.5 dBs
(0dBs= 0.775Vrms)
Input impedance: more than 47 kilohms

Audio output: LINE OUT
Standard level: -7.5dBs at load impedance 47 kilohms
Output impedance: less than 10 kilohms

2-1-6. Adjustment Sequence

The adjustments should be performed in the following sequence.



2-2. POWER SUPPLY CHECK

2-2-1. Output Voltage Check (MA-327 Board)

Mode	E-E
Measuring Instrument	Digital voltmeter
SW 12V Check	
Measurement point	IC601 pin ②
Specified value	12.0 ± 0.3V
MTR12V Check	
Measurement point	Q605 ③
Specified value	13.2 ± 1.0V
SW5V Check	
Measurement point	Q603 ⑤
Specified value	5.1 ± 0.3V

[Check Method]

- 1) Each of these supply voltages must meet its specified value.

2-3. SERVO SYSTEM CHECK

Unless otherwise specified, set the switches to the following positions.

- **INPUT SELECT** switch LINE 1
- **TAPE SPEED** switch SP

2-3-1. RF Switching Position/ AF Switching Position Adjustments (MA-327 Board)

[Adjustment Purpose]

To adjust the link of the A-ch and B-ch of the tape playback outputs. To make the unit compatible with other tapes and units. If this specification is not satisfied, the link will appear on the screen and the screen will be disrupted, etc.

Mode	Playback
Signal	Alignment tape: SP color bar portion
Measurement point	CH1: Video LINE OUT (RF switching position) CN341 pin ① (HF ADJ) (AF switching position) CH2: CN261 pin ③ (RF SWP)
Measuring instrument	Oscilloscope
Specified value	$6.5 \pm 0.5H$ ($410 \pm 32 \mu\text{sec}$)

[Adjustment Method]

- 1) Short-circuit between JS161 and ground for about 1 second to activate the RF switching position adjustment mode.
- 2) Check that "AP" is indicated on FL display.
- 3) Using the channel + and - buttons, adjust to $410 \pm 32 \mu\text{sec}$ ($6.5 \pm 0.5H$).
- 4) Press the PAUSE button. (Adjustment is over for mono models.)
- 5) The set goes to the AF switching position adjustment mode.
- 6) Check that "AH" is indicated on FL display.
- 7) Using the channel + and - buttons, minimize a chipped portion. At this time, confirm that a noisy sound is not heard.
- 8) Press the PAUSE button.
- 9) Check that "AH" indication is disappeared. When it is not disappeared, repeat from the item 1).
- 10) Press the STOP button.
- 11) Press the EJECT button.

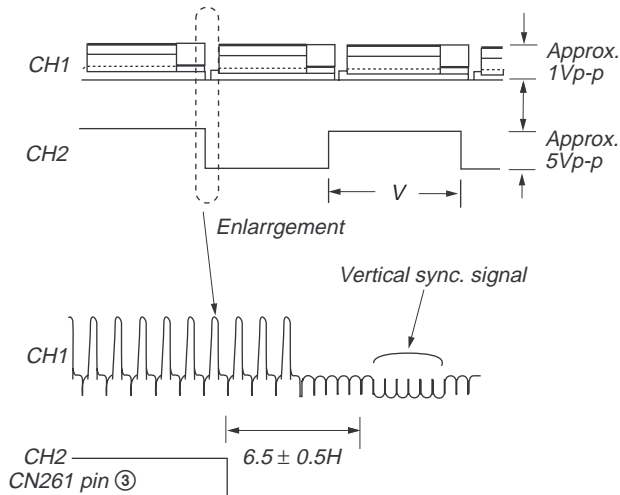


Fig. 6-2-3.

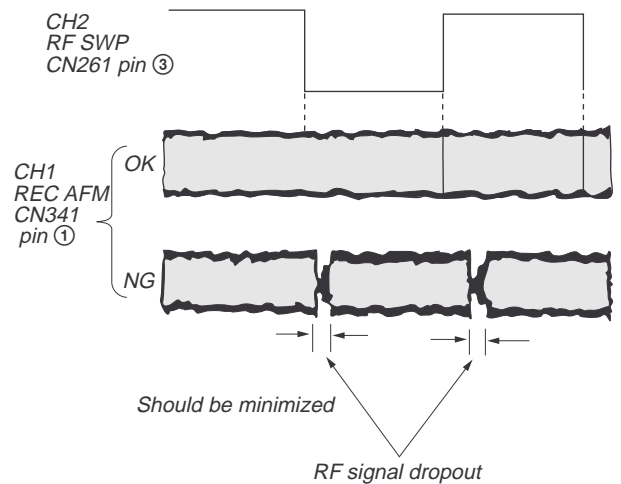


Fig. 6-2-4.

2-4. VIDEO SYSTEM CHECKS

For the video system checks, follow the checking procedures given below as a rule. The color bar video signal supplied from the pattern generator is used as the video input signal for the video system adjustment of the recording mode. Check that the signal satisfies the specified value designated in the "Check of input signal" (Fig. 6-2-2).

Unless otherwise specified, set the switches to the following positions.

- **INPUT SELECT** switch LINE 1
- **TAPE SPEED** switch SP

[Checking Sequence]

- 1) X'tal OSC Check
- 2) SYNC AGC Check
- 3) Recording Y Level Check
- 4) Recording Chroma Level Check
- 5) Playback Level Check

2-4-1. X'tal OSC Check (MA-327 Board)

Mode	Playback
Signal	Alignment tape: SP Color bar portion
Measurement point	IC201 pin ⑤⑥
Measuring instrument	Oscilloscope and Frequency counter
Specified value	3,579,545 \pm 70Hz

Note: A frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Check Method]

- 1) Check that the oscillation frequency satisfies the specified value and that the oscillation voltage is $500 \pm 200\text{mVp-p}$.

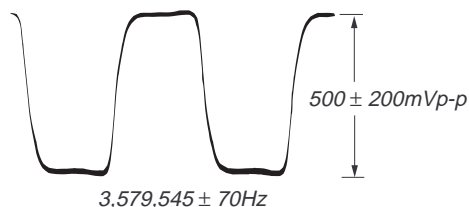


Fig. 6-2-5.

2-4-2. SYNC AGC Check (MA-327 Board)

Mode	E-E
Signal	Color bar
Measurement point	IC201 pin ③⑧
Measuring instrument	Oscilloscope
Specified value	$A=2.10 \pm 0.10\text{Vp-p}$

[Check Method]

- 1) Check that the Video signal level (A) satisfies the specified value.

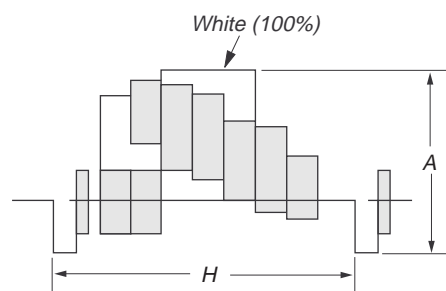


Fig. 6-2-6.

2-4-3. Recording Y Level Check (MA-327 Board)

Mode	E-E (SP)
Signal	No-signal
Measurement point	IC201 pin ⑬
Measuring instrument	Oscilloscope
Specified value	$A=290 \pm 70\text{mVp-p}$

[Check Method]

- 1) Check that the recording RF signal satisfies the specified value.



Fig. 6-2-7.

2-4-4. Recording Chroma Level Check (MA-327 Board)

Mode	Recording (SP)
Signal	Color bar
Measurement point	IC201 pin ⑭
Measuring instrument	Oscilloscope
Specified value	$A=450 \pm 70\text{mVp-p}$

[Check Method]

- 1) Confirm the amplitude of recording chroma level becomes the specified value.

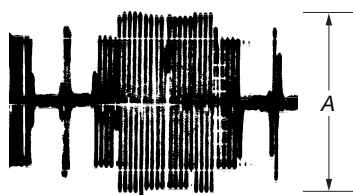


Fig. 6-2-8.

2-4-5. Playback Level Check (MA-327 Board)

Mode	Playback
Signal Alignment	Alignment tape : SP mode color bar portion
Measurement point	Video LINE OUT terminal
Measuring instrument	Oscilloscope
Specified value	$A=1.0 \pm 0.1\text{Vp-p}$ (75Ω terminated)

[Check Method]

- 1) Check that the playback level satisfies the specified value.

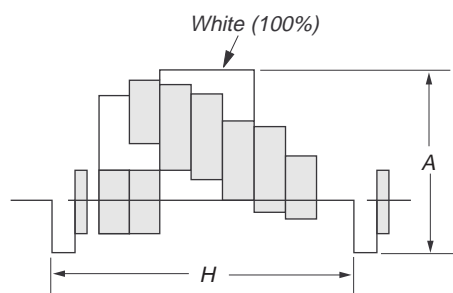


Fig. 6-2-9.

2-5. AUDIO SYSTEM ADJUSTMENT

- For the adjustment of the audio system, perform in the SP mode if there is no special notes. Use the alignment tape.

[Connecting Instruments]

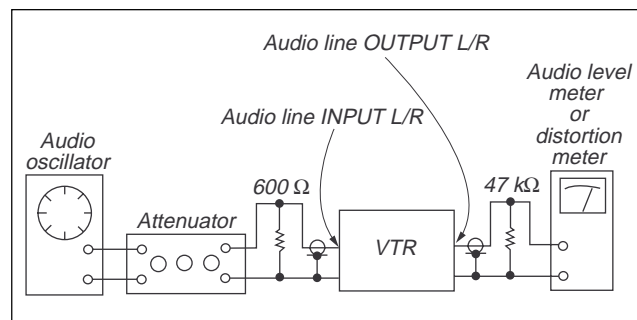


Fig. 6-2-10.

- Adjust in the SP mode if there is no special indications.
- Perform the adjustment setting the switch on the following positions.
- **INPUT SELECT** switch LINE 1

[Adjustment Method]

1. ACE head adjustment....Refer to the VHS mechanical adjustment manual VI (S MECHANISM)(9-921-647-11).
2. E-E output level check
3. Overall Output level and distortion factor check
4. Overall noise level check.

2-5-1. ACE Head Adjustment

Refer to the VHS mechanical adjustment manual VI (S MECHANISM)(9-921-647-11).

2-5-2. E-E Output Level Check

Mode	E-E
Signal	400Hz, -7.5dBs : CJ570
Measurement point	CJ570
Measuring instrument	Audio level meter
Specified value	$-7.5 \pm 2\text{dBs}$

[Check Method]

- 1) Input signal of 400Hz and -7.5dBs to the CJ461 L/R.
- 2) Check that the audio output level is $-7.5 \pm 3\text{dBs}$.

2-5-3. Overall Output Level and Distortion Factor Check

Mode	Self-record playback
Signal	400Hz, -7.5dBs : CJ570
Measurement point	CJ570
Measuring instrument	Audio level meter and Distortion meter
Specified value	Playback Level: $-7.5 \pm 3\text{dBs}$ Distortion: 4.0% or less

[Check Method]

- 1) Input signal of 400Hz and -7.5dBs to the audio input.
- 2) Record signal.
- 3) Playback the recorded portion.
- 4) Check that the output level is $-7.5 \pm 3\text{dBs}$.
- 5) Check that the distortion factor is 4.0% or less.

2-5-4. Overall Noise Level Check

Mode	Self-record playback
Signal	No signal (Insert a shorting plug into the Audio LINE IN terminal)
Measurement point	CJ570
Measuring instrument	Audio level meter
Specified value	-45.5dBs or less

[Check Method]

- 1) Record.
- 2) Playback recorded portion.
- 3) Check that noise level is -45.5dBs or less.

2-6. TUNER SYSTEM ADJUSTMENT

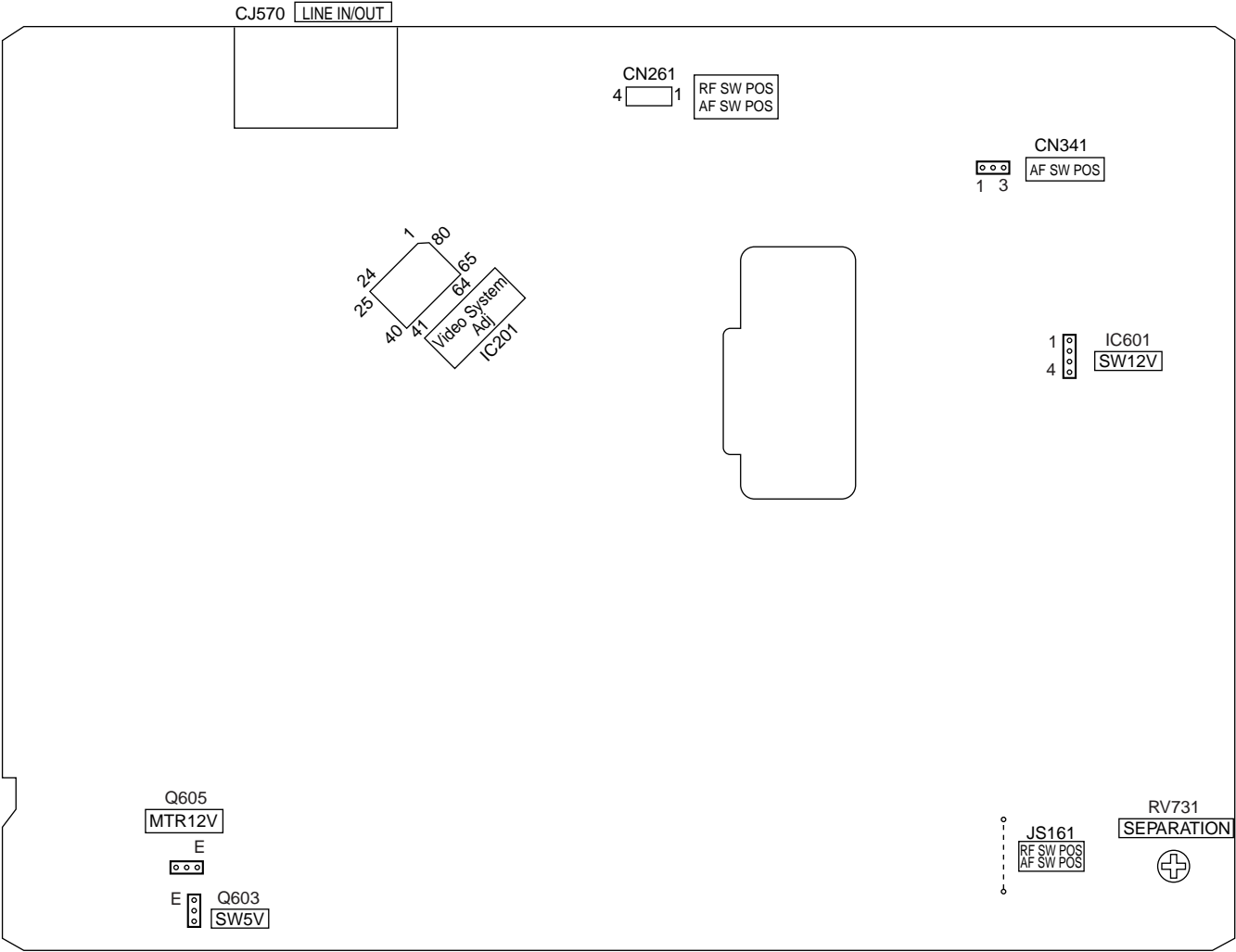
2-6-1. Separation Adjustment (MA-327 Board)

Mode	E-E
Signal	RF signal Video : Color bar white (100%) modulation Audio : L: 400Hz, R: 2kHz 30% modulation Electrical field: 60-80dBm/75 Ω terminated
Measuring instrument	Audio level meter
Measuring point	LINE OUT L
Adjusting element	RV731
Specified value	2kHz component minimum

[Adjustment Method]

- 1) Connect an audio level meter to LINE OUT L channel via HPF.
- 2) Feed the RF signal from RF IN terminal.
- 3) Adjust with RV731 so that the output level satisfies the specified value.

2-7. ADJUSTING PARTS LOCATION DIAGRAM
MA-327 BOARD (CONDUCTOR SIDE)



SECTION 7

REPAIR PARTS LIST

7-1. EXPLODED VIEWS

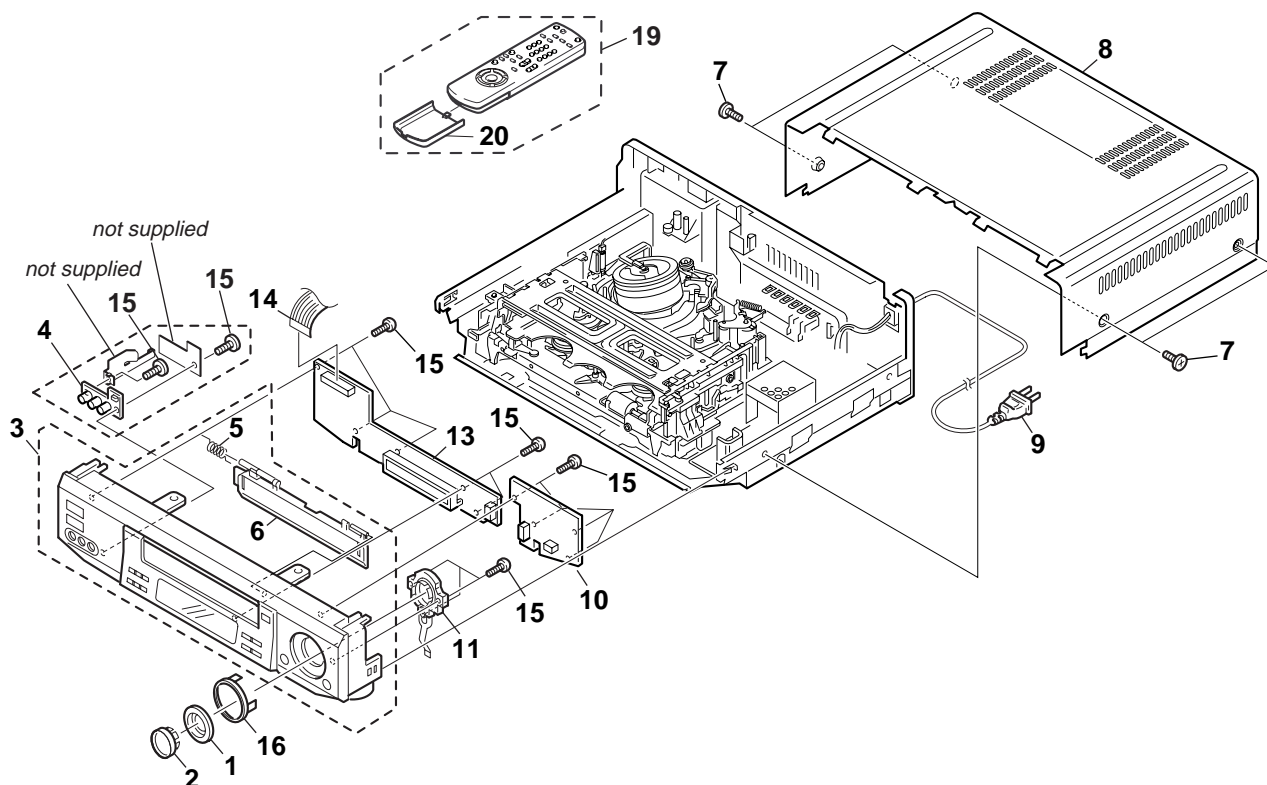
NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (#mark) list is given in the last of this parts list.

The components identified by mark \triangle or dotted line with mark \triangle are critical for safety. Replace only with part number specified.

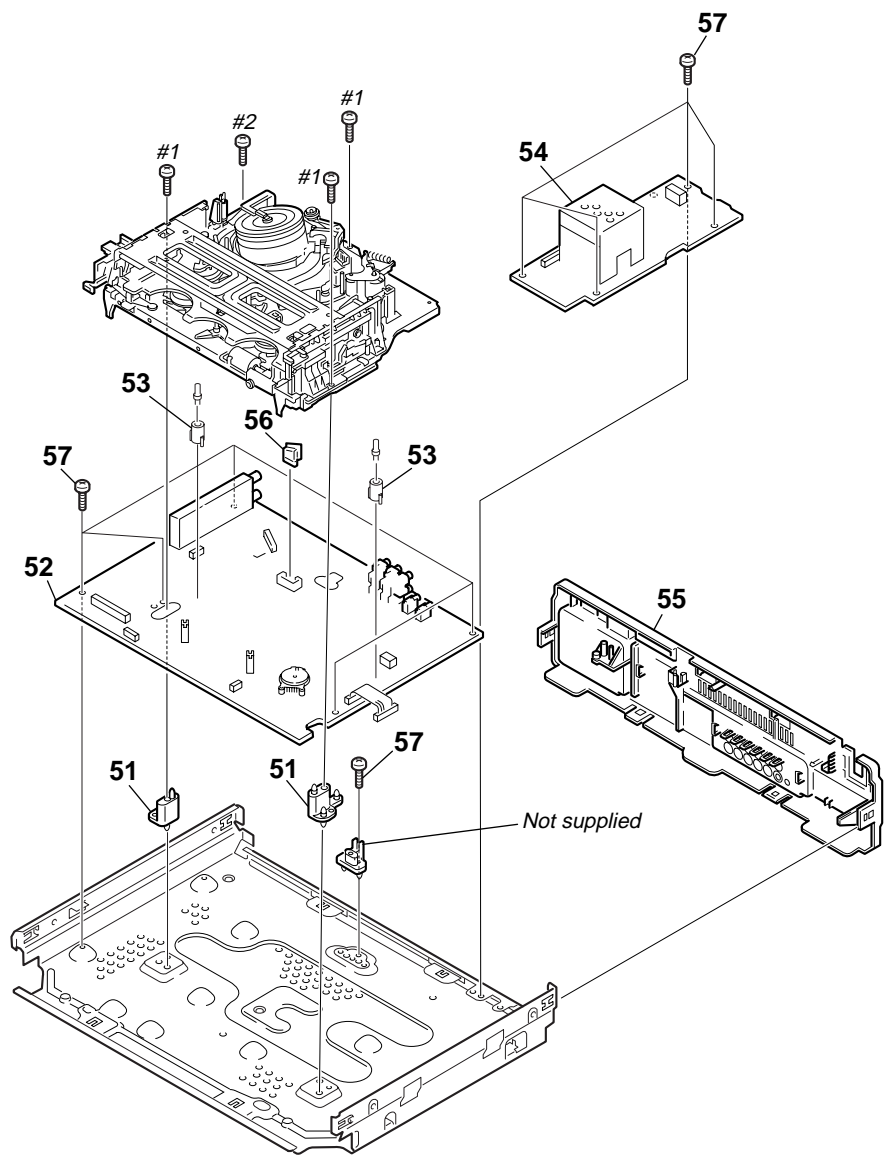
Les composants identifiés par une marque \triangle sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

7-1-1. FRONT PANEL ASSEMBLY AND UPPER CASE SECTION



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
1	3-979-310-01	RING (AV), JOG EXCEPT 777HF: Canadian)		8	3-979-313-21	CASE, UPPER (777HF: Canadian)	
1	3-988-327-01	RING (M), JOG (777HF: Canadian)		8	3-979-313-01	CASE, UPPER (EXCEPT 777HF: Canadian)	
2	3-979-309-11	BUTTON (AV), CENTER (777HF: Canadian)		\triangle 9	1-777-854-21	CORD, POWER	
2	3-979-309-01	BUTTON (AV), CENTER (EXCEPT 777HF: Canadian)		* 10	A-6791-463-A	DM-80 COMPL BOARD, COMPLETE	
3	X-3948-559-2	PANEL ASSY, FRONT (777HF: US)		11	1-762-844-21	SWITCH, ROTARY	
3	X-3948-155-2	PANEL ASSY, FRONT (777HF: Canadian)		* 13	A-6791-461-A	FR-138 COMPL BOARD, COMPLETE	
3	X-3947-897-2	PANEL ASSY, FRONT (788HF: Canadian)		14	1-783-132-11	CABLE, FLAT (FFM-22)	
3	X-3947-897-1	PANEL ASSY, FRONT (788HF: US)		15	4-921-277-41	SCREW (B2.6X8), TAPPING, BIND	
* 4	A-6791-462-A	JK-162 COMPL BOARD, COMPLETE		16	4-977-593-21	RING (DIA. 50), ORNAMENTAL	
5	3-953-432-01	SPRING (GE), FL					(777HF: Canadian)
6	3-979-302-02	DOOR (AV), CASSETTE (EXCEPT 777HF: Canadian, 788HF: US)		19	1-475-553-31	COMMANDER, STANDARD (RMT-V231B)	
6	3-979-302-01	DOOR (AV), CASSETTE (788HF: US)					(EXCEPT 788HF)
6	3-987-899-01	DOOR, CASSETTE, (P) (777HF: Canadian)		19	1-475-554-31	COMMANDER, STANDARD (RMT-V232B)	
7	3-710-901-11	SCREW, TAPPING					(788HF)
				20	3-709-128-01	COVER, BATTERY (EXCEPT 788HF)	
				20	3-709-129-01	COVER, BATTERY (788HF)	

7-1-2. CHASSIS SECTION

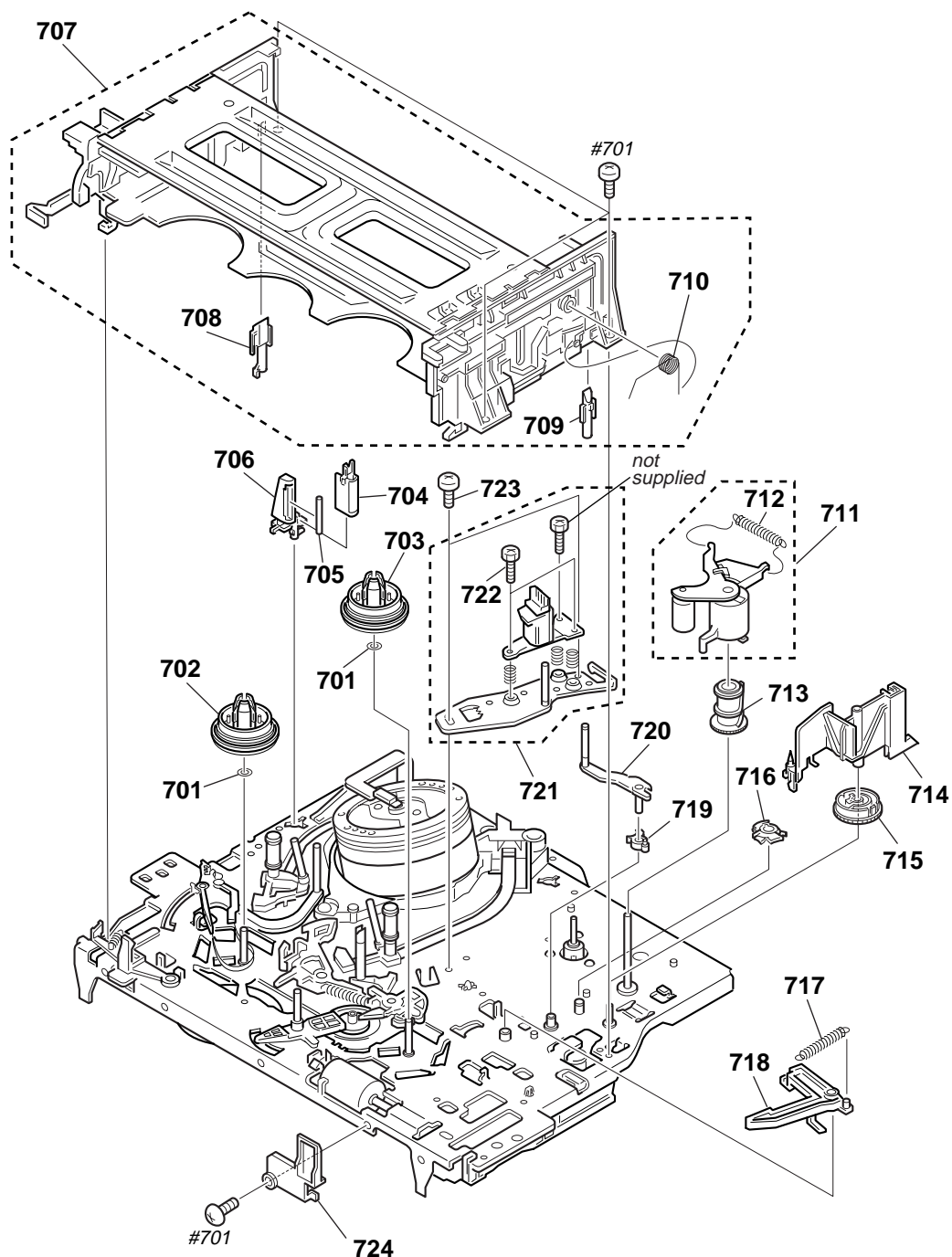


Ref. No.	Part No.	Description	Remarks
51	3-979-314-01	BASE (R), MD	
* 52	A-6791-459-A	MA-327(A) BOARD, COMPLETE (788HF)	
* 52	A-6791-538-A	MA-327(B) BOARD, COMPLETE (777HFPX)	
* 52	A-6791-460-A	MA-327(B) BOARD, COMPLETE (EXCEPT 777HFPX, 788HF)	
* 53	3-960-273-01	SPACER, TOP END	
△ 54	1-468-281-11	POWER BLOCK SR801 (US, Canadian)	

Ref. No.	Part No.	Description	Remarks
△ 54	1-468-282-11	POWER BLOCK SR709 (PX)	
* 55	3-979-564-11	PANEL, REAR (EXCEPT 788HF)	
* 55	3-979-564-01	PANEL, REAR (788HF)	
56	1-779-725-11	CONNECTOR, BOARD TO BOARD 5P	
57	3-970-608-21	SUMITITE (B3), +BV	
Q101	8-729-043-84	TRANSISTOR PT380F3	
Q102	8-729-043-84	TRANSISTOR PT380F3	

Note : The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.	Note : Les composants identifiés par une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.
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7-1-3. MECHANISM DECK-1



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
701	3-977-509-01	WASHER, THRUST		713	3-977-447-01	GEAR, ELEVATOR	
702	3-977-507-01	TABLE, REEL (S) (GRAY)		714	3-977-514-01	OPENER, LID	
703	3-977-508-01	TABLE, REEL (T) (BLACK)		715	3-977-441-01	GEAR, PINCH PRESSING	
704	1-500-144-11	HEAD, FE		716	3-977-445-01	GEAR, TG8 ARM DRIVING	
705	3-977-495-01	SHAFT TG2		717	3-977-465-01	SPRING, EXTENSION (RVS BRAKE)	
706	3-977-494-01	HOLDER, FEH		718	X-3947-582-1	ARM ASSY, RVS BRAKE	
707	A-6759-619-C	FL COMPLETE ASSY		719	3-977-446-01	GEAR, TG8 ARM	
708	3-977-535-01	PLATE, LUMINOUS (END SENSOR)		720	X-3947-590-1	TG8 ASSY	
709	3-977-536-01	PLATE, LUMINOUS (TOP SENSOR)		721	A-6759-620-A	HEAD BLOCK ASSY, ACE (TDK)	
710	3-970-471-01	SPRING (DECK OPEN), TORSION		722	3-974-556-01	+ HEXA TT 2.6X9 (TAPER)	
711	A-6759-615-A	PRESS BLOCK ASSY, PINCH		723	3-979-508-01	SCREW	
712	3-958-455-01	SPRING (PINCH), TENSION		724	3-978-485-01	PLATE, GUIDE CASSETTE	

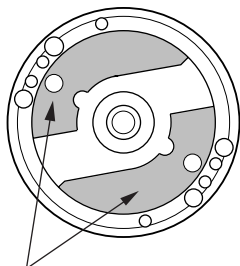
7-1-4. MECHANISM DECK-2

Note: There are two types of drum assembly in the 777HF, 778HF models.

[Discrimination]

No. 768-770

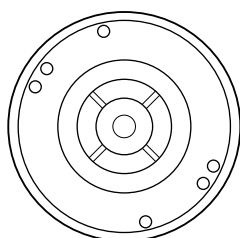
—Top View—



There are two printed circuit boards on the top.

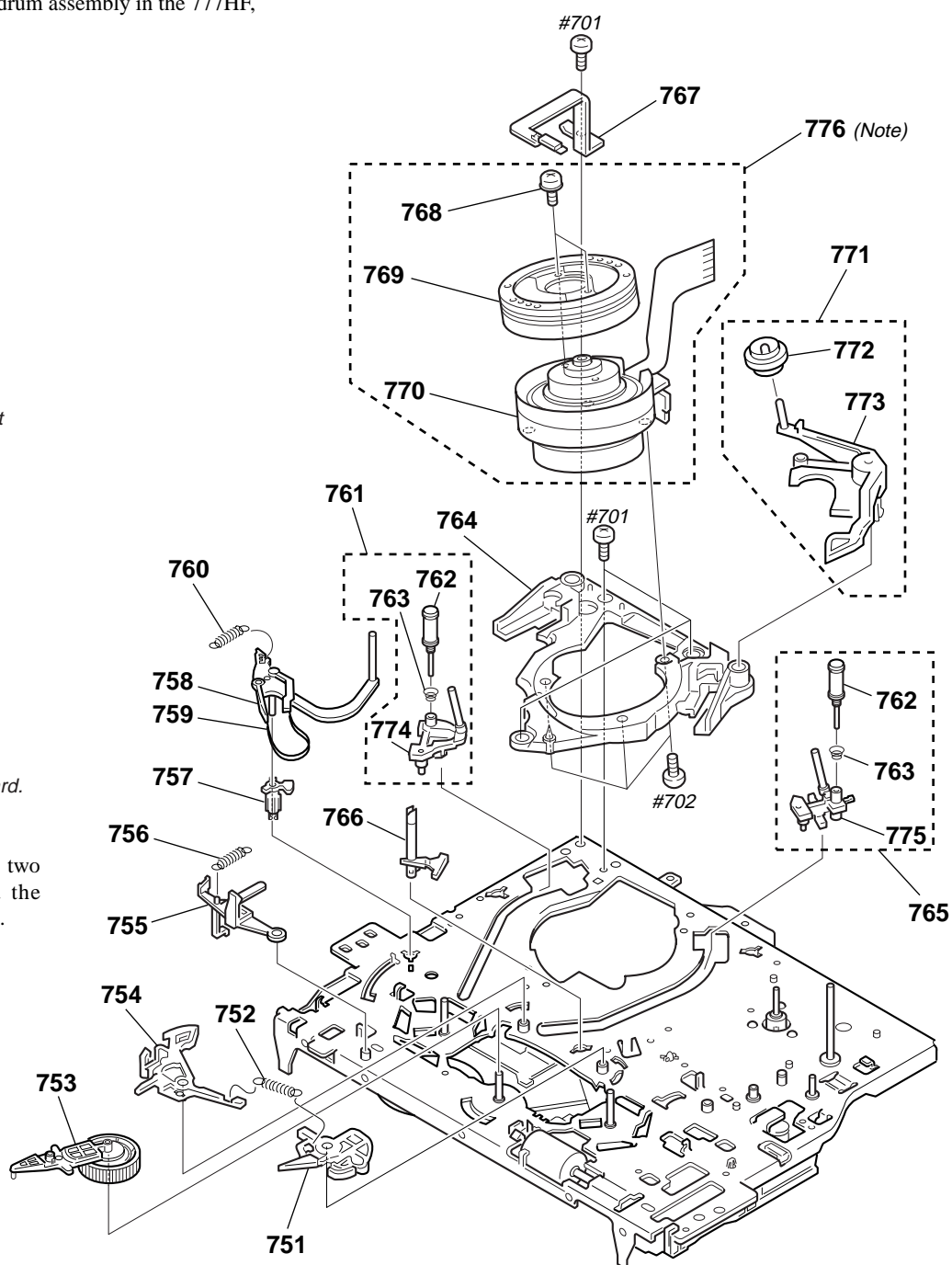
No. 776

—Top View—



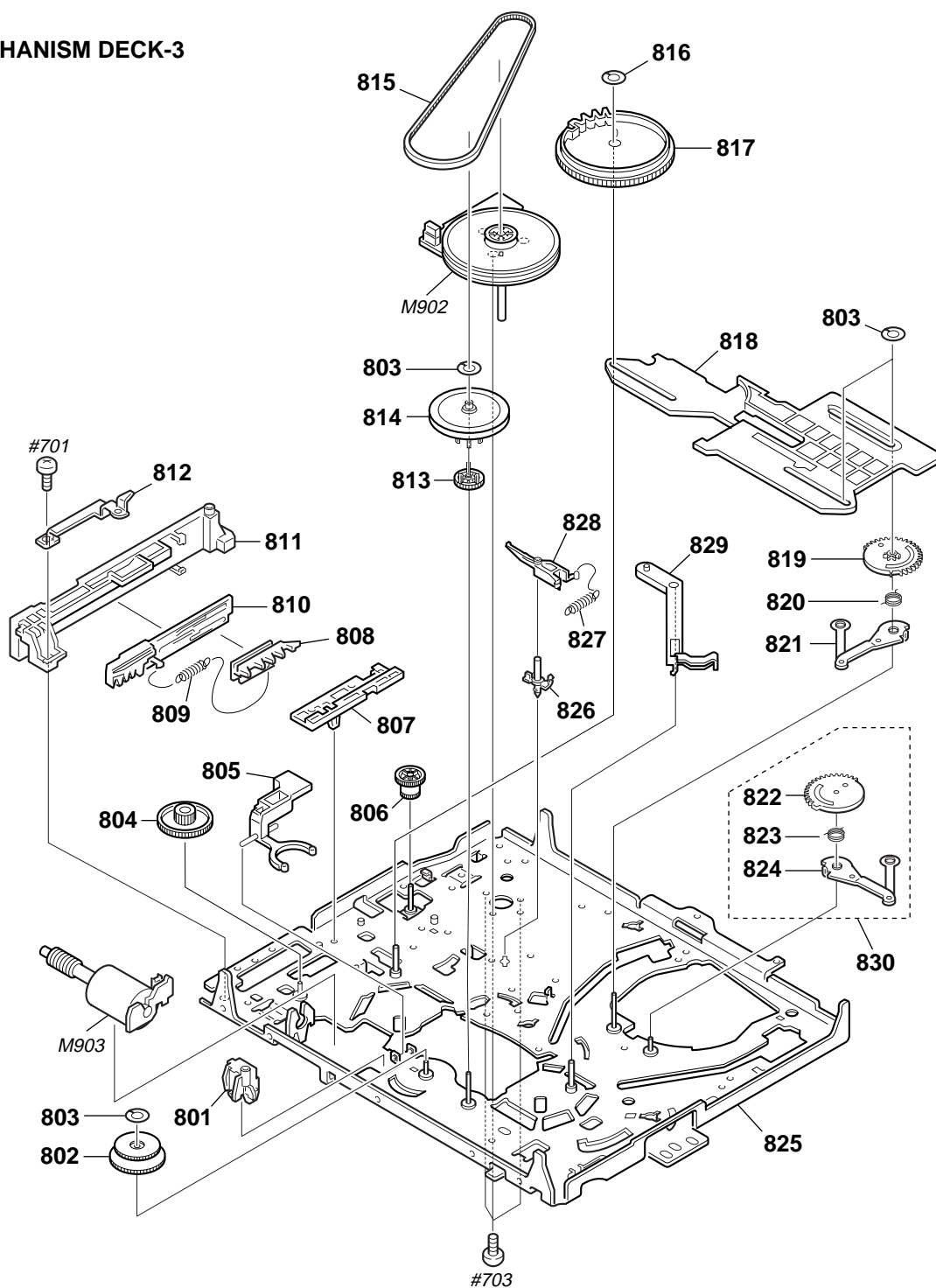
There is no printed circuit board.

Note: It cannot be divided to two parts, the upper and the lower drum assemblies.



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
751	X-3947-581-1	BRAKE ASSY,MAIN(T)		765	A-6750-325-A	SHUTTLE (T) BLOCK ASSY	
752	3-977-462-01	SPRING,EXTENTION. (MAIN BRAKE)		766	3-977-501-01	PLATE, LUMINOUS	
753	X-3947-573-1	ARM ASSY, PENDULUM		767	X-3943-899-8	GROUND ASSY, SHAFT	
754	X-3947-580-2	BRAKE ASSY, MAIN(S)		768	2-643-205-01	SCREW	
755	3-977-513-02	LEVER, REC. PROOF		769	8-848-576-02	DRUM ASSY, UPPER DZR-45-R (777HF, 778HF)	(Note)
756	3-976-767-01	SPRING, TENS. (REC. PROOF)		770	8-848-666-11	DRUM ASSY, LOWER DZL-51B/J-RP (M901)	(777HF, 778HF)
757	3-977-487-01	BOSS, TG1 FULCRUM		771	A-6746-074-G	ROLLER BLOCK ASSY, HC	
758	X-3947-587-1	TG1 ASSY		772	X-3947-255-1	ROLLER ASSY, HC	
759	X-3947-589-1	BAND ASSY, TG1		773	3-975-724-07	ARM, HC	
760	3-977-488-01	SPRING (POWER TENSION)		774	X-3946-855-1	SHUTTLE (S) ASSY	
761	A-6750-324-A	SHUTTLE (S) BLOCK ASSY		775	X-3946-856-1	SHUTTLE (T) ASSY	
762	X-3944-378-1	ROLLER ASSY, GUIDE		776	8-839-044-02	DRUM ASSY DZH-94A/Z-RP (M901) (Note)	
763	3-965-178-01	SPRING					
764	3-969-632-04	BASE, DRUM					

7-1-5. MECHANISM DECK-3



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
801	3-977-437-01	RETAINER,CAM MOTOR		817	3-977-439-01	GEAR, CAM	
802	X-3947-584-1	ASSY, REEL DIRECT		818	3-977-442-01	SLIDER	
803	3-977-443-01	WASHER, STOPPER		819	3-977-455-01	GEAR, LOADING(T)	
804	3-977-438-01	WORM - WHEEL		820	3-977-456-03	SPRING, TORSION (LOAD T)	
805	3-977-506-01	ARM, LIMITTER SELECTION		821	X-3947-579-1	LEVER ASSY, LOADING(T)	
806	3-977-444-01	GEAR, PINCH TRANSMISSION		822	3-977-451-01	GEAR, LOADING(S)	
807	3-977-515-01	GUIDE, FL SLIDER		823	3-977-452-01	SPRING, TORSION (LOAD S)	
808	3-977-517-01	PLATE, SLIDE, FL		824	X-3947-578-1	LEVER ASSY, LOADING(S)	
809	3-977-519-01	SPRING, TENS. (LIMIT, FL)		825	X-3947-576-2	CHASSIS ASSY, MECHANICAL	
810	3-977-518-02	PLATE, LIMITTER, FL		826	3-977-468-01	SHAFT, CAPSTAN BRAKE	
811	3-977-516-01	HOLDER, FL SLIDER		827	3-977-467-02	SPRING, CAP BRAKE	
812	3-977-877-01	PLATE, RETAINER		828	X-3947-583-1	BRAKE ASSY, CAPSTAN	
813	3-977-504-01	GEAR, CLUTCH		829	3-977-489-01	ARM, TG1 DRIVING	
814	X-3947-585-1	GEAR ASSY, PULLEY		830	A-6759-616-A	GEAR BLOCK ASSY, LOADING	
815	3-977-510-01	BELT, RUBBER		M902	1-698-971-11	MOTOR, DC	
816	3-977-440-01	WASHER, STOPPER		M903	X-3947-577-1	MOTOR ASSY, CAM	

7-2. ELECTRICAL PARTS LIST

NOTE:

When indicating parts by reference number, please include the board name.

The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked “*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS:
uF: μ F
- RESISTORS
All resistors are in ohms.
METAL: metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F: nonflammable
- COILS
uH: μ H
- SEMICONDUCTORS
In each case, u: μ , for example:
uA...: μ A..., uPA..., μ PA...,
uPB..., μ PB..., uPC..., μ PC...,
uPD..., μ PD...

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
*	A-6791-463-A	DM-80 BOARD, COMPLETE ***** (Ref.No.: 2,000 Series)				< JUMPER RESISTOR >	
		< CONNECTOR >		JR401	1-216-296-00	METAL CHIP 0 5% 1/8W	
CN440	1-568-665-11	CONNECTOR, BOARD TO BOARD 11P				< COIL >	
CN441	1-770-514-41	CONNECTOR, FFC/FPC 5P		L420	1-414-934-21	INDUCTOR 10uH	
		< DIODE >				< FLUORESCENT INDICATOR >	
D440	8-719-056-06	DIODE SLR-342DC3F		ND420	1-517-716-11	INDICATOR TUBE, FLUORESCENT	
		< RESISTOR >				< TRANSISTOR >	
R451	1-216-053-00	METAL CHIP 1.5K 5% 1/10W		Q401	8-729-421-22	TRANSISTOR UN2211	
R452	1-216-053-00	METAL CHIP 1.5K 5% 1/10W				< RESISTOR >	
R453	1-216-053-00	METAL CHIP 1.5K 5% 1/10W		R401	1-216-029-00	METAL CHIP 150 5% 1/10W	
R454	1-216-013-00	METAL CHIP 33 5% 1/10W		R402	1-249-437-11	CARBON 47K 5% 1/4W	
R455	1-216-037-00	METAL CHIP 330 5% 1/10W		R409	1-216-013-00	METAL CHIP 33 5% 1/10W	
		< SWITCH >		R414	1-249-421-11	CARBON 2.2K 5% 1/4W F	
S441	1-762-196-21	SWITCH, TACT (EJECT)		R415	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
S442	1-762-196-21	SWITCH, TACT (REC)		R416	1-216-083-00	METAL CHIP 27K 5% 1/10W	
S443	1-762-196-21	SWITCH, TACT (JOG)		R421	1-216-295-00	METAL CHIP 0 5% 1/10W	
S444	1-762-196-21	SWITCH, TACT (PAUSE)		R422	1-216-049-00	METAL CHIP 1K 5% 1/10W	
				R423	1-216-049-00	METAL CHIP 1K 5% 1/10W	
				R424	1-216-049-00	METAL CHIP 1K 5% 1/10W	
*	A-6791-461-A	FR-138 BOARD, COMPLETE ***** (Ref.No.: 2,000 Series)		R425	1-216-085-00	METAL CHIP 33K 5% 1/10W	
				R426	1-216-065-91	RES,CHIP 4.7K 5% 1/10W	
				R427	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
*	3-972-815-01	HOLDER (100), FL		R440	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
		< CAPACITOR >		R441	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
C405	1-164-232-11	CERAMIC CHIP 0.01uF 50V		R442	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
C422	1-124-589-11	ELECT 47uF 20% 16V		R443	1-216-065-91	RES,CHIP 4.7K 5% 1/10W	
C423	1-164-232-11	CERAMIC CHIP 0.01uF 50V		R444	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
* C424	1-165-319-11	CERAMIC CHIP 0.1uF 50V		R445	1-216-077-00	METAL CHIP 15K 5% 1/10W	
		< CONNECTOR >		R446	1-216-689-11	METAL CHIP 39K 0.5% 1/10W	
CN401	1-568-671-11	CONNECTOR, BOARD TO BOARD 11P				< SWITCH >	
CN402	1-695-376-21	PIN, CONNECTOR (PC BOARD) 15P		S401	1-762-196-21	SWITCH, TACT (POWER)	
		< DIODE >		S402	1-762-196-21	SWITCH, TACT (REW)	
D405	8-719-056-07	DIODE SLR-342MCT31		S403	1-762-196-21	SWITCH, TACT (CHANNEL/TRACKING +)	
D420	8-719-110-03	DIODE RD7.5ES-B2		S404	1-762-196-21	SWITCH, TACT (EASY SET UP)	
		< IC >		S405	1-762-196-21	SWITCH, TACT (FF)	
IC420	8-759-366-44	IC uPD16312GB-3B4		S406	1-762-196-21	SWITCH, TACT (CHANNEL/TRACKING -)	
IC461	8-749-011-22	IC GP1U27X		S407	1-762-196-21	SWITCH, TACT (TV/VIDEO)	
				S408	1-762-196-21	SWITCH, TACT (SP/EP)	
				S409	1-762-196-21	SWITCH, TACT (INPUT SELECT)	

Ref. No.	Part No.	Description	Remarks			Ref. No.	Part No.	Description	Remarks		
*	A-6791-462-A	JK-162 BOARD, COMPLETE ***** (Ref.No.: 2,000 Series)				C167	1-163-229-11	CERAMIC CHIP 12PF	5%	50V	
		< CAPACITOR >				C168	1-163-227-11	CERAMIC CHIP 10PF	0.5PF	50V	
C806	1-163-009-11	CERAMIC CHIP 0.001uF	10%	50V		C169	1-163-235-11	CERAMIC CHIP 22PF	5%	50V	
		< JACK >				C170	1-163-234-11	CERAMIC CHIP 20PF	5%	50V	
CJ801	1-774-509-11	JACK, PIN 3P (LINE-2 IN)				C171	1-163-809-11	CERAMIC CHIP 0.047uF	10%	25V	
		< CONNECTOR >				C172	1-163-259-91	CERAMIC CHIP 220PF	5%	50V	
CN801	1-506-484-11	PIN, CONNECTOR 5P				C174	1-163-007-11	CERAMIC CHIP 680PF	10%	50V	
		< DIODE >				C175	1-126-935-11	ELECT 470uF	20%	6.3V	
D801	8-719-108-12	DIODE RD9.1E-W				C176	1-128-131-11	ELECT 22uF	20%	50V	
D802	8-719-108-12	DIODE RD9.1E-W				C177	1-163-009-11	CERAMIC CHIP 0.001uF	10%	50V	
D803	8-719-109-84	DIODE RD5.1ES-B1				C178	1-128-131-11	ELECT 22uF	20%	50V	
D804	8-719-108-12	DIODE RD9.1E-W				C179	1-128-131-11	ELECT 22uF	20%	50V	
		< RESISTOR >				C180	1-163-037-11	CERAMIC CHIP 0.022uF	10%	25V	
R801	1-216-295-00	METAL CHIP 0	5%	1/10W		C181	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
R802	1-216-295-00	METAL CHIP 0	5%	1/10W		C182	1-126-933-11	ELECT 100uF	20%	16V	
R803	1-216-022-00	METAL CHIP 75	5%	1/10W		C183	1-163-809-11	CERAMIC CHIP 0.047uF	10%	25V	
						C184	1-163-809-11	CERAMIC CHIP 0.047uF	10%	25V	
*	A-6791-459-A	MA-327(A) BOARD, COMPLETE (788HF) *****				C186	1-164-004-11	CERAMIC CHIP 0.1uF	10%	25V	
*	A-6791-460-A	MA-327(B) BOARD, COMPLETE (777HF,778HF) *****				C201	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
*	A-6791-538-A	MA-327(B) BOARD, COMPLETE (777HFPX) ***** (Ref.No.: 1,000 Series)				C202	1-163-809-11	CERAMIC CHIP 0.047uF	10%	25V	
*	3-960-273-01	SPACER, TOP END				C204	1-164-232-11	CERAMIC CHIP 0.01uF		50V	
*	3-960-274-01	SPACER, LED				C205	1-163-037-11	CERAMIC CHIP 0.022uF	10%	25V	
		< CAPACITOR >				C206	1-164-232-11	CERAMIC CHIP 0.01uF		50V	
C101	1-163-009-11	CERAMIC CHIP 0.001uF	10%	50V		C207	1-164-232-11	CERAMIC CHIP 0.01uF		50V	
C102	1-163-009-11	CERAMIC CHIP 0.001uF	10%	50V		C208	1-163-243-11	CERAMIC CHIP 47PF	5%	50V	
C103	1-163-009-11	CERAMIC CHIP 0.001uF	10%	50V		C209	1-124-248-00	ELECT 22uF	20%	35V	
C104	1-163-009-11	CERAMIC CHIP 0.001uF	10%	50V		C210	1-163-131-00	CERAMIC CHIP 390PF	5%	50V	
C105	1-128-057-11	ELECT 330uF	20%	6.3V		C211	1-163-239-11	CERAMIC CHIP 33PF	5%	50V	
C106	1-124-589-11	ELECT 47uF	20%	16V		C213	1-163-257-11	CERAMIC CHIP 180PF	5%	50V	
C107	1-109-982-11	CERAMIC CHIP 1uF	10%	10V		C214	1-163-235-11	CERAMIC CHIP 22PF	5%	50V	
C108	1-164-004-11	CERAMIC CHIP 0.1uF	10%	25V		C217	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
C109	1-164-004-11	CERAMIC CHIP 0.1uF	10%	25V		C219	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C111	1-164-232-11	CERAMIC CHIP 0.01uF		50V		C220	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
C112	1-164-232-11	CERAMIC CHIP 0.01uF		50V		C222	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C115	1-164-232-11	CERAMIC CHIP 0.01uF		50V		C223	1-124-589-11	ELECT 47uF	20%	16V	
C116	1-164-232-11	CERAMIC CHIP 0.01uF		50V		C226	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C117	1-164-161-11	CERAMIC CHIP 0.0022uF	10%	100V		C228	1-124-261-00	ELECT 10uF	20%	50V	
C161	1-163-038-00	CERAMIC CHIP 0.1uF		25V		C229	1-164-159-21	CERAMIC 0.1uF		50V	
C162	1-164-232-11	CERAMIC CHIP 0.01uF		50V		C230	1-124-589-11	ELECT 47uF	20%	16V	
C163	1-164-232-11	CERAMIC CHIP 0.01uF		50V		C231	1-124-261-00	ELECT 10uF	20%	50V	
C164	1-104-905-11	CAPACITOR 0.22F		5.5V		C232	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
C165	1-124-589-11	ELECT 47uF	20%	16V		C233	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
C166	1-163-038-00	CERAMIC CHIP 0.1uF		25V		C234	1-164-232-11	CERAMIC CHIP 0.01uF		50V	
						C235	1-164-232-11	CERAMIC CHIP 0.01uF		50V	
						C236	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
						C237	1-164-232-11	CERAMIC CHIP 0.01uF		50V	
						C238	1-164-159-21	CERAMIC 0.1uF		50V	
						C240	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
						C241	1-163-037-11	CERAMIC CHIP 0.022uF	10%	25V	
						C242	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
						C243	1-164-232-11	CERAMIC CHIP 0.01uF		50V	
						C245	1-163-809-11	CERAMIC CHIP 0.047uF	10%	25V	
						C246	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
						C247	1-163-809-11	CERAMIC CHIP 0.047uF	10%	25V	
						C248	1-164-232-11	CERAMIC CHIP 0.01uF		50V	
						C250	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
						C251	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
						C252	1-164-232-11	CERAMIC CHIP 0.01uF		50V	
						C253	1-164-004-11	CERAMIC CHIP 0.1uF	10%	25V	
						C254	1-163-038-00	CERAMIC CHIP 0.1uF		25V	

Ref. No.	Part No.	Description	Remarks			Ref. No.	Part No.	Description	Remarks		
C255	1-163-038-00	CERAMIC CHIP	0.1uF		25V	C362	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C256	1-163-038-00	CERAMIC CHIP	0.1uF		25V	C363	1-126-960-11	ELECT	1uF	20%	50V
C257	1-128-172-11	ELECT	47uF	20%	6.3V	C364	1-126-960-11	ELECT	1uF	20%	50V
C260	1-163-229-11	CERAMIC CHIP	12PF	5%	50V	C365	1-126-960-11	ELECT	1uF	20%	50V
C261	1-163-229-11	CERAMIC CHIP	12PF	5%	50V	C366	1-126-960-11	ELECT	1uF	20%	50V
C264	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C369	1-126-964-11	ELECT	10uF	20%	50V
C265	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C370	1-126-964-11	ELECT	10uF	20%	50V
C266	1-164-232-11	CERAMIC CHIP	0.01uF		50V	C371	1-126-964-11	ELECT	10uF	20%	50V
C267	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C372	1-126-964-11	ELECT	10uF	20%	50V
C268	1-163-241-11	CERAMIC CHIP	39PF	5%	50V	C373	1-126-964-11	ELECT	10uF	20%	50V
C269	1-163-241-11	CERAMIC CHIP	39PF	5%	50V	C374	1-126-960-11	ELECT	1uF	20%	50V
C270	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C375	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C271	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C377	1-126-967-11	ELECT	47uF	20%	16V
C272	1-163-241-11	CERAMIC CHIP	39PF	5%	50V	C378	1-126-964-11	ELECT	10uF	20%	50V
C273	1-163-241-11	CERAMIC CHIP	39PF	5%	50V	C379	1-126-961-11	ELECT	2.2uF	20%	50V
C274	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C380	1-126-964-11	ELECT	10uF	20%	50V
C276	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C381	1-126-967-11	ELECT	47uF	20%	16V
C277	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C383	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C278	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C384	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C279	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	C385	1-126-967-11	ELECT	47uF	20%	16V
C280	1-124-584-00	ELECT	100uF	20%	10V	C386	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C281	1-164-005-11	CERAMIC CHIP	0.47uF		25V	C391	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C282	1-164-232-11	CERAMIC CHIP	0.01uF		50V	C398	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C283	1-163-038-00	CERAMIC CHIP	0.1uF		25V	C399	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C284	1-163-038-00	CERAMIC CHIP	0.1uF		25V	C521	1-124-584-00	ELECT	100uF	20%	10V
C286	1-124-584-00	ELECT	100uF	20%	10V	C522	1-124-584-00	ELECT	100uF	20%	10V
C287	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V	C523	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C288	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V	C524	1-124-584-00	ELECT	100uF	20%	10V
C289	1-163-038-00	CERAMIC CHIP	0.1uF		25V	C526	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C291	1-163-222-11	CERAMIC CHIP	5PF	0.25PF	50V	C527	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C292	1-163-038-00	CERAMIC CHIP	0.1uF		25V	C528	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C301	1-164-159-21	CERAMIC	0.1uF		50V	C529	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C305	1-126-160-11	ELECT	1uF	20%	50V	C530	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C306	1-126-960-11	ELECT	1uF	20%	50V	C531	1-124-464-11	ELECT	0.22uF	20%	50V
C307	1-126-964-11	ELECT	10uF	20%	50V	C532	1-126-160-11	ELECT	1uF	20%	50V
C308	1-126-967-11	ELECT	47uF	20%	16V	C560	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C309	1-126-963-11	ELECT	4.7uF	20%	50V	C561	1-126-935-11	ELECT	470uF	20%	6.3V
C310	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	C563	1-124-589-11	ELECT	47uF	20%	16V
C311	1-163-014-00	CERAMIC CHIP	0.0027uF	10%	50V	C564	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C312	1-164-232-11	CERAMIC CHIP	0.01uF		50V	C621	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C313	1-124-261-00	ELECT	10uF	20%	50V	C622	1-126-965-11	ELECT	22uF	20%	50V
C314	1-164-232-11	CERAMIC CHIP	0.01uF		50V	C623	1-126-967-11	ELECT	47uF	20%	16V
C315	1-126-160-11	ELECT	1uF	20%	50V	C624	1-126-967-11	ELECT	47uF	20%	16V
C317	1-126-163-11	ELECT	4.7uF	20%	50V	C625	1-126-967-11	ELECT	47uF	20%	16V
C318	1-126-967-11	ELECT	47uF	20%	16V	C626	1-128-131-11	ELECT	22uF	20%	50V
C331	1-164-232-11	CERAMIC CHIP	0.01uF		50V	C627	1-128-131-11	ELECT	22uF	20%	50V
C332	1-164-232-11	CERAMIC CHIP	0.01uF		50V	C628	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C333	1-124-589-11	ELECT	47uF	20%	16V	C629	1-126-966-11	ELECT	33uF	20%	16V
C334	1-137-374-11	FILM	0.047uF	5%	50V	C701	1-126-967-11	ELECT	47uF	20%	16V
C340	1-164-232-11	CERAMIC CHIP	0.01uF		50V	C705	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C341	1-124-589-11	ELECT	47uF	20%	16V	C706	1-126-963-11	ELECT	4.7uF	20%	50V
C342	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	C707	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C346	1-164-232-11	CERAMIC CHIP	0.01uF		50V	C708	1-126-933-11	ELECT	100uF	20%	16V
C350	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	C709	1-126-933-11	ELECT	100uF	20%	16V
C352	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	C710	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C353	1-163-038-00	CERAMIC CHIP	0.1uF		25V	C712	1-126-933-11	ELECT	100uF	20%	16V
C357	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	C713	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C358	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	C733	1-126-160-11	ELECT	1uF	20%	50V
C359	1-164-232-11	CERAMIC CHIP	0.01uF		50V	C735	1-126-964-11	ELECT	10uF	20%	50V
C361	1-164-222-11	CERAMIC CHIP	0.22uF		25V	C736	1-126-967-11	ELECT	47uF	20%	16V

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
C980	1-163-038-00	CERAMIC CHIP 0.1uF	25V	IC162	8-759-248-87	IC MM1256XF-BE	
C981	1-126-967-11	ELECT 47uF 20%	16V	IC201	8-759-488-74	IC LA71534M-MPB	
C982	1-163-038-00	CERAMIC CHIP 0.1uF	25V	IC202	8-759-439-51	IC LC89978M-TE-L	
C983	1-163-038-00	CERAMIC CHIP 0.1uF	25V	IC260	8-759-352-17	IC HA118195NT	
C984	1-163-009-11	CERAMIC CHIP 0.001uF 10%	50V	IC301	8-759-499-30	IC BA7755AF-E2	
C985	1-163-017-00	CERAMIC CHIP 0.0047uF 5%	50V	IC340	8-759-486-92	IC LA7256	
C986	1-163-038-00	CERAMIC CHIP 0.1uF	25V	IC360	8-759-486-64	IC TDA9615H/N1,557	
< JACK >				IC521	8-759-478-25	IC M35052-052FP-T4	
CJ570	1-779-011-11	JACK, PIN 6P (LINE-1 IN/LINE OUT)		IC601	8-759-438-18	IC PQ12RD08	
< CONNECTOR >				IC733	8-742-037-00	HY B IC SBX1837-51	
CN101	1-779-724-11	CONNECTOR, BOARD TO BOARD 5P		IC980	8-759-356-27	IC NJM2129M-TE2	
CN102	1-779-723-11	CONNECTOR, BOARD TO BOARD 9P		< IF BLOCK >			
* CN103	1-766-716-11	CONNECTOR, BOARD TO BOARD 3P		IF702	1-475-548-11	IF UNIT (IFZ-450ST)	
CN104	1-506-470-11	PIN, CONNECTOR 5P		< JUMPER RESISTOR >			
CN105	1-695-338-11	PIN, CONNECTOR (PC BOARD) 15P		JR001	1-216-295-00	METAL CHIP 0 5% 1/10W	
CN161	1-506-468-11	PIN, CONNECTOR 3P		JR002	1-216-295-00	METAL CHIP 0 5% 1/10W	
CN260	1-766-986-11	CONNECTOR, FFC/FPC 13P		JR003	1-216-295-00	METAL CHIP 0 5% 1/10W	
* CN261	1-560-892-00	PIN, CONNECTOR 4P		JR004	1-216-295-00	METAL CHIP 0 5% 1/10W	
CN301	1-506-469-11	PIN, CONNECTOR 4P		JR005	1-216-295-00	METAL CHIP 0 5% 1/10W	
CN302	1-506-468-11	PIN, CONNECTOR 3P		JR006	1-216-296-00	METAL CHIP 0 5% 1/8W	
* CN341	1-560-891-00	PIN, CONNECTOR 3P		JR007	1-216-296-00	METAL CHIP 0 5% 1/8W	
CN423	1-506-470-11	PIN, CONNECTOR 5P		JR008	1-216-296-00	METAL CHIP 0 5% 1/8W	
* CN602	1-568-938-11	PIN, CONNECTOR 11P (777HFPX)		JR009	1-216-296-00	METAL CHIP 0 5% 1/8W	
CN603	1-569-337-11	CONNECTOR, BOARD TO BOARD 11P (EXCEPT 777HFPX)		JR010	1-216-296-00	METAL CHIP 0 5% 1/8W	
< JACK >				JR011	1-216-296-00	METAL CHIP 0 5% 1/8W	
CNJ980	1-779-013-11	JACK, MINIATURE (CABLE BOX CONTROL/CONTROL S OUT)		JR012	1-216-296-00	METAL CHIP 0 5% 1/8W	
CNJ981	1-784-598-11	JACK (S LINK/CONTROL S OUT) (788HF)		JR013	1-216-296-00	METAL CHIP 0 5% 1/8W	
< DIODE >				JR014	1-216-296-00	METAL CHIP 0 5% 1/8W	
D103	8-719-048-26	DIODE GL528V1		JR015	1-216-296-00	METAL CHIP 0 5% 1/8W	
D109	8-719-200-82	DIODE 11ES2		JR016	1-216-295-00	METAL CHIP 0 5% 1/10W	
D161	8-719-200-82	DIODE 11ES2		JR017	1-216-296-00	METAL CHIP 0 5% 1/8W	
D162	8-719-200-82	DIODE 11ES2		JR018	1-216-296-00	METAL CHIP 0 5% 1/8W	
D370	8-719-110-08	DIODE RD8.2ES-B2		JR019	1-216-296-00	METAL CHIP 0 5% 1/8W	
D379	8-719-911-19	DIODE 1SS119		JR020	1-216-296-00	METAL CHIP 0 5% 1/8W	
D521	8-719-911-19	DIODE 1SS119		JR021	1-216-296-00	METAL CHIP 0 5% 1/8W	
D560	8-719-109-74	DIODE RD4.3ES-B1		JR022	1-216-296-00	METAL CHIP 0 5% 1/8W	
D561	8-719-109-74	DIODE RD4.3ES-B1		JR023	1-216-296-00	METAL CHIP 0 5% 1/8W	
D611	8-719-911-19	DIODE 1SS119		JR024	1-216-296-00	METAL CHIP 0 5% 1/8W	
D612	8-719-109-85	DIODE RD5.1ES-B2		JR025	1-216-295-00	METAL CHIP 0 5% 1/10W	
D614	8-719-911-19	DIODE 1SS119		JR026	1-216-296-00	METAL CHIP 0 5% 1/8W	
D702	8-719-150-92	DIODE RD33ES-T1B		JR027	1-216-296-00	METAL CHIP 0 5% 1/8W	
D980	8-719-110-08	DIODE RD8.2ES-B2		JR028	1-216-295-00	METAL CHIP 0 5% 1/10W	
D981	8-719-110-08	DIODE RD8.2ES-B2		JR029	1-216-295-00	METAL CHIP 0 5% 1/10W	
D982	8-719-911-19	DIODE 1SS119		JR030	1-216-296-00	METAL CHIP 0 5% 1/8W	
D983	8-719-110-08	DIODE RD8.2ES-B2 (788HF)		JR031	1-216-296-00	METAL CHIP 0 5% 1/8W	
D984	8-719-110-08	DIODE RD8.2ES-B2 (788HF)		JR032	1-216-296-00	METAL CHIP 0 5% 1/8W	
< IC >				JR033	1-216-295-00	METAL CHIP 0 5% 1/10W	
IC101	8-759-481-46	IC LB1943		< JUMPER RESISTOR >			
IC160	8-759-525-07	IC M37777M7A235GP-C		JS102	1-216-295-00	METAL CHIP 0 5% 1/10W	
IC161	8-759-432-32	IC ST24W04FM6TR		JS524	1-216-295-00	METAL CHIP 0 5% 1/10W	
IC161	8-759-518-23	IC X24C04S8		JS609	1-216-295-00	METAL CHIP 0 5% 1/10W	
IC161	8-759-432-32	IC AT24C04N-10SC-#		JS982	1-216-295-00	METAL CHIP 0 5% 1/10W (788HF)	
				JS983	1-216-295-00	METAL CHIP 0 5% 1/10W (777HF,778HF)	
				JS984	1-216-295-00	METAL CHIP 0 5% 1/10W (788HF)	

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
< COIL >				< RESISTOR >			
L161	1-414-936-21	INDUCTOR 22uH		R101	1-249-413-11	CARBON 470 5%	1/4W F
L163	1-414-936-21	INDUCTOR 22uH		R102	1-216-089-00	METAL CHIP 47K 5%	1/10W
L201	1-414-946-21	INDUCTOR 39uH		R103	1-216-089-00	METAL CHIP 47K 5%	1/10W
L202	1-414-940-21	INDUCTOR 100uH		R104	1-216-081-00	METAL CHIP 22K 5%	1/10W
L204	1-414-940-21	INDUCTOR 100uH		R105	1-216-081-00	METAL CHIP 22K 5%	1/10W
L261	1-414-939-21	INDUCTOR 68uH		R106	1-249-400-11	CARBON 39 5%	1/4W F
L262	1-414-940-21	INDUCTOR 100uH		R107	1-249-400-11	CARBON 39 5%	1/4W F
L263	1-414-940-21	INDUCTOR 100uH		R109	1-216-089-00	METAL CHIP 47K 5%	1/10W
L331	1-414-940-21	INDUCTOR 100uH		R110	1-216-089-00	METAL CHIP 47K 5%	1/10W
L341	1-414-940-21	INDUCTOR 100uH		R111	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
L521	1-414-940-21	INDUCTOR 100uH		R112	1-216-065-91	RES,CHIP 4.7K 5%	1/10W
L523	1-414-940-21	INDUCTOR 100uH		R115	1-216-089-00	METAL CHIP 47K 5%	1/10W
L524	1-414-930-21	INDUCTOR 2.2uH		R116	1-216-089-00	METAL CHIP 47K 5%	1/10W
L560	1-414-940-21	INDUCTOR 100uH		R117	1-216-041-00	METAL CHIP 470 5%	1/10W
L604	1-410-519-11	INDUCTOR 68uH		R118	1-216-089-00	METAL CHIP 47K 5%	1/10W
L605	1-414-930-21	INDUCTOR 2.2uH		R119	1-216-077-00	METAL CHIP 15K 5%	1/10W
L606	1-414-934-21	INDUCTOR 10uH		R120	1-249-417-11	CARBON 1K 5%	1/4W F
L607	1-414-930-21	INDUCTOR 2.2uH		R121	1-216-077-00	METAL CHIP 15K 5%	1/10W
L702	1-414-938-21	INDUCTOR 47uH		R122	1-216-073-00	METAL CHIP 10K 5%	1/10W
L703	1-414-930-21	INDUCTOR 2.2uH		R124	1-216-065-91	RES,CHIP 4.7K 5%	1/10W
L704	1-414-938-21	INDUCTOR 47uH		R160	1-216-049-00	METAL CHIP 1K 5%	1/10W
L731	1-414-934-21	INDUCTOR 10uH		R162	1-216-113-00	METAL CHIP 470K 5%	1/10W
< PHOTO INTERRUPTER >				R163	1-216-105-91	RES,CHIP 220K 5%	1/10W
PH101	8-749-013-23	PHOTO INTERRUPTER GP3S120		R165	1-216-295-00	METAL CHIP 0 5%	1/10W
PH102	8-749-013-23	PHOTO INTERRUPTER GP3S120		R167	1-216-121-91	RES,CHIP 1M 5%	1/10W
< IC LINK >				R168	1-216-039-00	METAL CHIP 390 5%	1/10W
△ PS101	1-533-586-00	LINK, IC 0.315A		R169	1-218-179-11	RES,CHIP 10M 5%	1/10W
△ PS600	1-533-592-00	LINK, IC 1.6A		R170	1-216-073-00	METAL CHIP 10K 5%	1/10W
< TRANSISTOR >				R171	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
Q101	8-729-043-84	TRANSISTOR PT380F3		R172	1-216-089-00	METAL CHIP 47K 5%	1/10W
Q102	8-729-043-84	TRANSISTOR PT380F3		R173	1-216-089-00	METAL CHIP 47K 5%	1/10W
Q103	8-729-281-53	TRANSISTOR 2SC1815-GR		R174	1-249-437-11	CARBON 47K 5%	1/4W
Q201	8-729-230-49	TRANSISTOR 2SC2712-G		R176	1-216-041-00	METAL CHIP 470 5%	1/10W
Q202	8-729-230-49	TRANSISTOR 2SC2712-G		R177	1-216-041-00	METAL CHIP 470 5%	1/10W
Q208	8-729-230-49	TRANSISTOR 2SC2712-G		R178	1-216-041-00	METAL CHIP 470 5%	1/10W
Q209	8-729-216-21	TRANSISTOR 2SA1162Y-TE85L		R179	1-247-843-11	CARBON 3.3K 5%	1/4W
Q210	8-729-230-49	TRANSISTOR 2SC2712-G		R180	1-247-843-11	CARBON 3.3K 5%	1/4W
Q211	8-729-230-49	TRANSISTOR 2SC2712-G		R181	1-216-051-00	METAL CHIP 1.2K 5%	1/10W
Q212	8-729-010-05	TRANSISTOR MSB709-RT1		R182	1-216-049-00	METAL CHIP 1K 5%	1/10W
Q260	8-729-230-49	TRANSISTOR 2SC2712-G		R184	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q301	8-729-281-53	TRANSISTOR 2SC1815-GR		R185	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q331	8-729-802-91	TRANSISTOR 2SD879		R186	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q379	8-729-216-22	TRANSISTOR 2SA1162		R187	1-216-075-00	METAL CHIP 12K 5%	1/10W
Q386	8-729-230-49	TRANSISTOR 2SC2712-G		R201	1-216-041-00	METAL CHIP 470 5%	1/10W
Q387	8-729-230-49	TRANSISTOR 2SC2712-G		R202	1-216-069-00	METAL CHIP 6.8K 5%	1/10W
Q523	8-729-010-05	TRANSISTOR MSB709-RT1		R203	1-216-049-00	METAL CHIP 1K 5%	1/10W
Q524	8-729-421-19	TRANSISTOR UN2213		R204	1-216-047-91	RES,CHIP 820 5%	1/10W
Q525	8-729-010-29	TRANSISTOR MSD601-RST1		R205	1-216-041-00	METAL CHIP 470 5%	1/10W
Q526	8-729-010-29	TRANSISTOR MSD601-RST1		R206	1-216-041-00	METAL CHIP 470 5%	1/10W
Q560	8-729-010-05	TRANSISTOR MSB709-RT1		R208	1-216-071-00	METAL CHIP 8.2K 5%	1/10W
Q603	8-729-018-99	TRANSISTOR 2SD2394-F		R209	1-216-295-00	METAL CHIP 0 5%	1/10W
Q603	8-729-019-01	TRANSISTOR 2SD2394-EF		R210	1-216-295-00	METAL CHIP 0 5%	1/10W
Q604	8-729-010-29	TRANSISTOR MSD601-RST1		R218	1-208-798-11	RES,CHIP 4.7K 0.50%	1/10W
Q605	8-729-140-93	TRANSISTOR 2SB733-34		R219	1-216-053-00	METAL CHIP 1.5K 5%	1/10W
Q606	8-729-119-78	TRANSISTOR 2SC2785-HFE		R222	1-216-051-00	METAL CHIP 1.2K 5%	1/10W

Note :

The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

Note :

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Ref. No.	Part No.	Description			Remarks	Ref. No.	Part No.	Description			Remarks
R227	1-216-025-91	RES,CHIP	100	5%	1/10W	R368	1-216-133-00	METAL CHIP	3.3M	5%	1/10W
R228	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	R370	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R229	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	R371	1-208-820-11	RES,CHIP	39K	0.50%	1/10W
R230	1-216-045-00	METAL CHIP	680	5%	1/10W	R372	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R231	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	R373	1-216-033-00	METAL CHIP	220	5%	1/10W
R232	1-249-420-11	CARBON	1.8K	5%	1/4W F	R374	1-216-033-00	METAL CHIP	220	5%	1/10W
R234	1-216-049-00	METAL CHIP	1K	5%	1/10W	R378	1-249-434-11	CARBON	27K	5%	1/4W
R235	1-216-295-00	METAL CHIP	0	5%	1/10W	R379	1-216-049-00	METAL CHIP	1K	5%	1/10W
R236	1-216-049-00	METAL CHIP	1K	5%	1/10W	R380	1-216-025-91	RES,CHIP	100	5%	1/10W
R239	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	R381	1-216-025-91	RES,CHIP	100	5%	1/10W
R240	1-216-049-00	METAL CHIP	1K	5%	1/10W	R382	1-216-295-00	METAL CHIP	0	5%	1/10W
R243	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	R383	1-216-295-00	METAL CHIP	0	5%	1/10W
R245	1-216-049-00	METAL CHIP	1K	5%	1/10W	R384	1-216-091-00	METAL CHIP	56K	5%	1/10W
R260	1-216-044-00	METAL CHIP	620	5%	1/10W	R385	1-216-091-00	METAL CHIP	56K	5%	1/10W
R261	1-216-044-00	METAL CHIP	620	5%	1/10W	R386	1-216-049-00	METAL CHIP	1K	5%	1/10W
R262	1-216-025-91	RES,CHIP	100	5%	1/10W	R387	1-216-049-00	METAL CHIP	1K	5%	1/10W
R263	1-216-025-91	RES,CHIP	100	5%	1/10W	R389	1-216-073-00	METAL CHIP	10K	5%	1/10W
R264	1-216-025-91	RES,CHIP	100	5%	1/10W	R391	1-216-049-00	METAL CHIP	1K	5%	1/10W
R265	1-216-025-91	RES,CHIP	100	5%	1/10W	R392	1-216-049-00	METAL CHIP	1K	5%	1/10W
R266	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	R393	1-216-295-00	METAL CHIP	0	5%	1/10W
R267	1-216-073-00	METAL CHIP	10K	5%	1/10W	R521	1-216-049-00	METAL CHIP	1K	5%	1/10W
R268	1-216-081-00	METAL CHIP	22K	5%	1/10W	R522	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R269	1-249-417-11	CARBON	1K	5%	1/4W F	R526	1-216-073-00	METAL CHIP	10K	5%	1/10W
R270	1-247-863-91	CARBON	22K	5%	1/4W	R530	1-216-073-00	METAL CHIP	10K	5%	1/10W
R271	1-216-049-00	METAL CHIP	1K	5%	1/10W	R531	1-216-073-00	METAL CHIP	10K	5%	1/10W
R272	1-216-077-00	METAL CHIP	15K	5%	1/10W	R532	1-216-033-00	METAL CHIP	220	5%	1/10W
R273	1-216-077-00	METAL CHIP	15K	5%	1/10W	R533	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R274	1-216-073-00	METAL CHIP	10K	5%	1/10W	R534	1-216-025-91	RES,CHIP	100	5%	1/10W
R275	1-216-073-00	METAL CHIP	10K	5%	1/10W	R535	1-208-814-11	RES,CHIP	22K	0.50%	1/10W
R276	1-216-049-00	METAL CHIP	1K	5%	1/10W	R536	1-208-812-11	RES,CHIP	18K	0.50%	1/10W
R301	1-216-093-00	METAL CHIP	68K	5%	1/10W	R537	1-216-073-00	METAL CHIP	10K	5%	1/10W
R302	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	R539	1-216-073-00	METAL CHIP	10K	5%	1/10W
R306	1-216-073-00	METAL CHIP	10K	5%	1/10W	R560	1-216-022-00	METAL CHIP	75	5%	1/10W
R307	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	R561	1-216-021-00	METAL CHIP	68	5%	1/10W
R309	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	R562	1-249-407-11	CARBON	150	5%	1/4W F
R310	1-216-129-00	METAL CHIP	2.2M	5%	1/10W	R563	1-249-407-11	CARBON	150	5%	1/4W F
R311	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	R565	1-216-037-00	METAL CHIP	330	5%	1/10W
R312	1-216-079-00	METAL CHIP	18K	5%	1/10W	R615	1-216-399-00	METAL OXIDE	6.8	5%	3W F
R313	1-216-109-00	METAL CHIP	330K	5%	1/10W	R617	1-249-417-11	CARBON	1K	5%	1/4W F
R314	1-216-035-00	METAL CHIP	270	5%	1/10W	R618	1-249-411-11	CARBON	330	5%	1/4W (777HFPX)
R315	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	R618	1-249-413-11	CARBON	470	5%	1/4W F (EXCEPT 777HFPX)
R316	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	R619	1-249-411-11	CARBON	330	5%	1/4W (777HFPX)
R317	1-216-079-00	METAL CHIP	18K	5%	1/10W	R619	1-249-413-11	CARBON	470	5%	1/4W F (EXCEPT 777HFPX)
R318	1-216-075-00	METAL CHIP	12K	5%	1/10W	R620	1-249-411-11	CARBON	330	5%	1/4W (777HFPX)
R320	1-216-047-91	RES,CHIP	820	5%	1/10W	R620	1-249-413-11	CARBON	470	5%	1/4W F (EXCEPT 777HFPX)
R331	1-217-671-11	METAL CHIP	1	5%	1/10W	R621	1-216-089-00	METAL CHIP	47K	5%	1/10W
R332	1-216-063-91	RES,CHIP	3.9K	5%	1/10W	R622	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R333	1-249-401-11	CARBON	47	5%	1/4W F	R623	1-247-843-11	CARBON	3.3K	5%	1/4W
R334	1-216-031-00	METAL CHIP	180	5%	1/10W	R624	1-216-430-11	METAL OXIDE	390	5%	1W F
R341	1-216-049-00	METAL CHIP	1K	5%	1/10W	R625	1-249-429-11	CARBON	10K	5%	1/4W
R342	1-216-049-00	METAL CHIP	1K	5%	1/10W	R626	1-249-417-11	CARBON	1K	5%	1/4W F
R344	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	R627	1-247-815-91	CARBON	220	5%	1/4W
R346	1-216-065-91	RES,CHIP	4.7K	5%	1/10W	R628	1-247-815-91	CARBON	220	5%	1/4W
R347	1-216-065-91	RES,CHIP	4.7K	5%	1/10W	R701	1-216-049-00	METAL CHIP	1K	5%	1/10W
R348	1-216-033-00	METAL CHIP	220	5%	1/10W	R702	1-216-061-00	METAL CHIP	3.3K	5%	1/10W

MA-327
POWER BLOCK SR801
POWER BLOCK SR709

Ref. No.	Part No.	Description	Remarks
△ R705	1-212-893-00	FUSIBLE 330 5%	1/4W F
R706	1-216-113-00	METAL CHIP 470K 5%	1/10W
R709	1-216-049-00	METAL CHIP 1K 5%	1/10W
R710	1-216-049-00	METAL CHIP 1K 5%	1/10W
R711	1-216-049-00	METAL CHIP 1K 5%	1/10W
R712	1-216-295-00	METAL CHIP 0 5%	1/10W
R731	1-216-049-00	METAL CHIP 1K 5%	1/10W
R732	1-216-049-00	METAL CHIP 1K 5%	1/10W
R733	1-216-065-91	RES,CHIP 4.7K 5%	1/10W
R734	1-216-049-00	METAL CHIP 1K 5%	1/10W
R735	1-216-049-00	METAL CHIP 1K 5%	1/10W
R736	1-216-295-00	METAL CHIP 0 5%	1/10W
R737	1-216-081-00	METAL CHIP 22K 5%	1/10W
R738	1-216-081-00	METAL CHIP 22K 5%	1/10W
R748	1-216-065-91	RES,CHIP 4.7K 5%	1/10W
R749	1-216-049-00	METAL CHIP 1K 5%	1/10W
R980	1-216-049-00	METAL CHIP 1K 5%	(788HF)
R981	1-216-295-00	METAL CHIP 0 5%	1/10W
< VARIABLE RESISTOR >			
RV731	1-241-766-11	RES, ADJ, CERMET 47K	
< SWITCH >			
S101	1-762-108-11	SWITCH, PUSH (1 KEY) (REC PROOF)	
S102	1-771-155-11	SWITCH, ROTARY (MECHANISM MODE)	
S701	1-571-588-11	SWITCH, SLIDE (RF UNIT CH3/CH4)	
< TRANSFORMER >			
T331	1-431-097-11	TRANSFORMER, BIAS OSCILLATION	
< TUNER >			
TU701	1-693-399-21	TUNER, MODULATOR (BTF-2RA401)	(788HF:US)
TU701	1-693-399-12	TUNER, MODULATOR (BTF-2RA401)	(EXCEPT 788HF:US)
< VIBRATOR >			
X160	1-760-494-11	VIBRATOR, CRYSTAL 16MHz	
X161	1-579-463-11	VIBRATOR, CRYSTAL 32.768kHz	
X202	1-577-380-11	VIBRATOR, CRYSTAL 3.579545MHz	
< CAPACITOR >			
△ C101	1-104-705-51	FILM 0.1uF	250V
△ C102	1-104-705-51	FILM 0.1uF	250V
C106	1-119-882-41	ELECT 120uF	200V
C107	1-126-963-11	ELECT 4.7uF	50V
C110	1-130-491-51	FILM 0.047uF	50V
C111	1-130-491-51	FILM 0.047uF	50V
C201	1-126-967-11	ELECT 47uF	50V
C202	1-126-183-11	ELECT 1000uF	16V
C203	1-126-934-11	ELECT 220uF	16V
C204	1-126-797-11	ELECT 1000uF	10V

Ref. No.	Part No.	Description	Remarks
C205	1-126-925-11	ELECT 470uF	10V
C206	1-126-967-11	ELECT 47uF	50V
C207	1-126-925-11	ELECT 470uF	10V
C208	1-126-960-11	ELECT 1uF	50V
< DIODE >			
D103	8-719-920-22	DIODE PR1005	
D104	8-719-109-61	DIODE ERA15-02	
D105	8-719-911-19	DIODE RD3.0ES	
D106	8-719-904-05	DIODE 1N4005	
D107	8-719-904-05	DIODE 1N4005	
D108	8-719-904-05	DIODE 1N4005	
D109	8-719-904-05	DIODE 1N4005	
D110	8-719-904-05	DIODE 1N4005	
D201	8-719-061-02	DIODE PR1003	
D202	8-719-510-73	DIODE S3L20U	
D204	8-719-027-20	DIODE D3S4M	
D205	8-719-058-08	DIODE RD51F	
D206	8-719-061-02	DIODE PR1003	
D207	8-719-061-02	DIODE PR1003	
< FUSE >			
△ F101	1-533-296-11	FUSE 2A	125V
< FERRITE BEAD >			
FB1	9-902-053-01	FERRITE BEAD	
< IC >			
△ IC201	8-759-420-19	IC AN1431T	
< PHOTOCOUPLER >			
△ PC101	8-719-018-29	PHOTOCOUPLER ON3131	
< TRANSISTOR >			
Q101	8-729-904-98	TRANSISTOR 2SC4054	
Q102	8-729-012-31	TRANSISTOR 2SC4040	
< RESISTOR >			
△ R101	1-219-779-51	CARBON 6.8M 10%	1/2W
△	1-465-282-11	POWER BLOCK SR709 (PX)	

(Ref. No.: 9,000 Series)			
< CAPACITOR >			
△ C101	1-104-705-51	FILM 0.1uF	250V
△ C102	1-104-705-51	FILM 0.1uF	250V
C111	1-126-947-11	ELECT 47uF	35V
C112	1-130-491-51	FILM 0.1uF	50V
C114	1-130-491-51	FILM 0.1uF	50V
C115	1-130-491-51	FILM 0.1uF	50V
C201	1-128-552-11	ELECT 47uF	63V
C202	1-126-183-11	ELECT 1000uF	16V
C203	1-126-934-11	ELECT 220uF	16V
C204	1-126-183-11	ELECT 1000uF	16V

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POWER BLOCK SR709

Ref. No.	Part No.	Description	Remarks
C205	1-126-925-11	ELECT 470uF	10V
C206	1-126-967-11	ELECT 47uF	50V
C207	1-126-925-11	ELECT 470uF	10V
< DIODE >			
D101	8-719-904-05	DIODE 1N4005	
D102	8-719-904-05	DIODE 1N4005	
D103	8-719-904-05	DIODE 1N4005	
D104	8-719-904-05	DIODE 1N4005	
D105	8-719-030-24	DIODE EG01C	
D107	8-719-061-02	DIODE PR1003	
D108	8-719-061-02	DIODE PR1003	
D201	8-719-030-24	DIODE EG01C	
D202	8-719-510-73	DIODE S3L20U	
D203	8-719-027-22	DIODE D3S6M	
D205	8-719-030-24	DIODE EG01C	
D206	8-719-061-02	DIODE PR1003	
< FUSE >			
△ F101	1-532-388-31	FUSE T2A	250V
< IC >			
△ IC201	8-759-420-19	IC AN1431T	
< PHOTOCOUPLER >			
△ PC101	8-749-010-65	PHOTOCOUPLER PC123	
< RESISTOR >			
R201	1-260-336-51	CARBON 4.7	1/2W
R208	1-249-401-51	CARBON 47	5% 1/4W
R209	1-249-393-51	CARBON 10	5% 1/4W

Ref. No.	Part No.	Description	Remarks
ACCESSORIES & PACKING MATERIALS			

1-475-553-31	COMMANDER, STANDARD(RMT-V231B)	(EXCEPT 788HF)	
1-475-554-31	COMMANDER, STANDARD(RMT-V232B)	(788HF)	
3-709-128-01	COVER, BATTERY (EXCEPT 788HF)		
3-709-129-01	COVER, BATTERY (788HF)		
*	3-979-316-02	INDIVIDUAL CARTON (788HF)	
*	3-979-316-32	INDIVIDUAL CARTON (777HFPX,778HF)	
*	3-979-316-41	INDIVIDUAL CARTON (777HF:US,Canadian)	
*	3-979-317-01	CUSHION	
*	3-979-512-01	SPACER	
1-569-008-11	ADAPTOR, CONVERSION 2P (PX)		
1-575-334-11	CORD, CONNECTION (EXCEPT 788HF)		
1-696-592-11	CORD, CONNECTION (NTSC)		
1-776-258-11	CORD, AVC CONNECTION (788HF)		
1-783-325-11	CORD, CONNECTION (CABLE MOUSE) (788HF)		
3-861-046-11	MANUAL, INSTRUCTION (ENGLISH) (788HF)		
3-861-046-21	MANUAL, INSTRUCTION (FRENCH)	(788HF:Canadian)	
3-861-049-11	MANUAL, INSTRUCTION (ENGLISH)	(EXCEPT 788HF)	
3-861-049-21	MANUAL, INSTRUCTION (FRENCH)	(778HF,777HF:Canadian)	
3-979-315-01	COVER, JACK		

HARDWARE LIST

#1	7-685-648-79	SCREW +BVTP 3X12 TYPE2 IT-3
#2	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3
#701	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3
#702	7-682-547-04	SCREW +P 3X6
#703	7-685-133-19	SCREW (DIA. 2.6) (IT3B)

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